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Type 2 diabetes is a disease of worldwide scope and epidemic proportion. Two hundred and eighty-five million individuals have been diagnosed worldwide—a number expected to rise to 330 million by 2025 (Unwin, Whiting, & Roglic, 2010) and to 366 million by 2030 (Adriaanse et al., 2008). It is estimated that 18.8 million diagnosed and 7.0 million undiagnosed Americans have type 2 diabetes, numbers expected to rise to a total of 48.3 million by 2050 (Centers for Disease Control [CDC], 2011; Geiss & Cowie, 2011; Narayan, Williams, Gregg, & Cowie 2011). A recent American Diabetes Association (ADA) report estimated that the total costs of diabetes related health care rose from $174 billion in 2007 to $245 billion in 2012—figures that underscore the significant social costs associated with the disease (ADA, 2013). The considerable personal, social, and financial tolls of type 2 diabetes make effective self-management imperative.

Diabetes-related distress (DRD) and mindfulness are two variables that are believed to significantly impact effective diabetes self-management yet more research is needed to better understand and empirically confirm these relationships. DRD is characterized by the negative emotional reactions to the diabetes diagnosis, threat of complications, self-management demands, and unsupportive interpersonal relationships (Polonsky et al., 1995, 2005; Gonzalez, Fisher, & Polonsky, 2011). Recent studies indicate the relevance of mindfulness, the mindfulness components of awareness and

acceptance, and the use of mindfulness-based interventions to enhance the self-management behaviors of individuals with type 2 diabetes (Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007; Hernandez, Bradish, Rodger, & Rybansky, 1999; Ingadottir & Halldorsdottir, 2008). However, to date the literature is incomplete in drawing an explicit connection between mindfulness, diabetes-related distress, and diabetes self-management. This study was designed to address this gap in the literature. The prevalence of type 2 diabetes, its related debilitating conditions (e.g., cardiovascular disease, vascular dementia, kidney disease, and diabetic retinopathy), and mental health implications, make the exploration of self-management pathways imperative so that counselors and counselor educators may develop a greater understanding of the type 2 diabetes condition and appropriate counseling approaches. Greater understanding of the mechanisms to better diabetes self-management, with mindfulness as the theoretical foundation, may pave the way for improved prevention and intervention efforts among health care and mental health professionals.

The results of the current study indicated that mindfulness is a statistically significant predictor of self-management. Further, the results indicated social support as a significant predictor of self-management. The results suggest the potential value of the clinical application of mindfulness-based interventions with the type 2 diabetes population and continued development of resources that provide positive social support for the millions of people who are affected by this disease.

THE RELATIONSHIPS BETWEEN MINDFULNESS, DIABETES-RELATED DISTRESS, SELECTED DEMOGRAPHIC VARIABLES, AND SELF-MANAGEMENT IN ADULTS WITH TYPE 2 DIABETES

by

Jennifer Bell Brown

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Approved by

Todd F. Lewis
Committee Chair

This dissertation is dedicated to my mother, Dr. Shirley Hinnant Bell,

who showed me how to pursue my dreams while raising a little one.

APPROVAL PAGE

This dissertation, written by Jennifer Bell Brown, has been accepted by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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I left the practice of law seven years ago because I felt that there was something else I was supposed to do in my life. Even though I knew that I needed to change careers, I began my counselor education with more than a little fear that I might have made a mistake. I prayed for a small sign—any indication—that would assure me that I had chosen the right path. Since that time, there have been many signs. There are the relationships with faculty who have not only given instruction and supervision, but also selflessly mentored me and encouraged me to trust my instincts as a burgeoning counselor, supervisor, and educator. There are the relationships with my brilliant, kind, and hilarious doctoral cohort—individuals who continually inspire me with their commitments to their research and the populations that they serve. Every client, student, and supervisee helped to confirm that I was moving in the right direction. I continue to be intrigued and inspired by the human capacity to meet seemingly insurmountable challenges, and I am thankful for every person who graced me with the opportunity to join with them as they worked toward meeting their goals. Each day since beginning this work I have awakened with the most important sign— a profound respect for the counseling profession and sincere gratitude for the opportunity to do this work. I prayed for a small sign, and I have been given more signs than I could have imagined that I have chosen the right path.

The dissertation process is an incredibly humbling experience. I am left with deep feelings of gratitude for every returned e-mail, phone call, encouraging nod, word

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CHAPTER I

INTRODUCTION

It is estimated that 25.8 million Americans (8.3% of the population), 18.8 million diagnosed and 7.0 million undiagnosed, people have type 2 diabetes (Centers for Disease Control [CDC], 2011). Although alarming, these statistics are expected to rise to 48.3 million by 2050 (Geiss & Cowie, 2011; Narayan et al., 2011). Two hundred and eighty-five million individuals have been diagnosed worldwide—a number expected to escalate to 330 million by 2025 (Unwin et al., 2010) and to 366 million by 2030 (Adriaanse et al., 2008). A review of the type 2 diabetes literature clearly indicates that minority and low-income groups are disproportionately affected by the disease. Although all socio-economic groups experience type 2 diabetes, it is estimated that of the 285 million cases worldwide, some 209 million individuals live in low to medium wealth countries, and the prevalence of diagnosis in higher wealth countries tends to be most concentrated amongst the poor (Pickett, Kelly, Brunner, Lobstein, & Wilkenson, 2005; Robbins & Webb, 2006; Unwin et al., 2010).

Given the physical and mental distress to individuals caused by poorly regulated type 2 diabetes and the considerable drain of diabetes related health care costs on the health care system, improving diabetes related outcomes is critical (Simons et al., 2005). In particular, improving effective diabetes self-management has been implicated in reducing the individual and systemic costs directly related to diabetic complications.

Mindfulness and diabetes-related distress are two variables that are believed to significantly impact effective diabetes self-management yet more research is needed to better understand and empirically confirm these relationships. Mindfulness is a skill that centers on one's ability to cultivate attention and awareness of one's experiences by adopting a stance of acceptance and curiosity (Bishop et al., 2004). Diabetes-related distress, an emotional condition that results from the combined effects of negotiating the demands of relationships with healthcare providers and family members and meeting diet, exercise, and medication regimens has been found to negatively impact the ability to engage in daily self-care, precluding effective self-management of the disease. It has been theorized that the ability to cope with chronic disease related distress is directly related to one's ability to face negative emotions and develop the capacity for emotion regulation (Davidson & Sutton, 1995; Spiegel, 1999). The current study is based, in part, on research that indicates that mindfulness based approaches and interventions may help those with chronic diseases regulate emotion, heighten awareness of the entirety of their experiences, develop acceptance of their life circumstances, and integrate healthy choices into their lifestyles (Hernandez, Bradish, et al., 1999; Price, 1993; Shapiro, Carlson, Astin, & Freedman, 2006).

In this chapter, a brief review of the definition and consequences of type 2 diabetes is presented. The key variables of the current study are (a) mindfulness, as a composite of the most commonly referenced factors that contribute to a mindful state, (b) awareness and acceptance, as precise components of the mindfulness construct, (c) diabetes-related distress, and (d) type 2 diabetes self-management. These variables are

defined and described, followed by a statement of the problem, statement of the purpose of the study, and research questions. The chapter concludes with definitions of important terms and an overview of the remaining chapters.

Definition and Consequences of Type 2 Diabetes

Type 2 diabetes is a chronic disease that occurs when the cells of the body fail to adequately absorb blood sugar (i.e., glucose). Without treatment, glucose builds in the blood and causes significant damage throughout the body. Type 2 diabetes is the seventh leading cause of death in the United States, accounting for approximately 2.9 million deaths a year. Persons with type 2 diabetes die at twice the rate of those of similar age without the disease (CDC, 2011). Type 2 diabetes is a leading cause of cardiovascular disease including stroke and high blood pressure, dental disease, kidney disease, blindness, nervous system disease, amputations, impaired immune function, and pregnancy complications (CDC, 2011).

The physical complications associated with type 2 diabetes are intensified by the mental health complications of the disease (Amoako, Skelly, & Rossen, 2008). People with type 2 diabetes are almost twice as likely to suffer from depression (10.4-11.2% of the diabetic population) and anxiety (15.3 % of the diabetic population) as the general population (Anderson, Freedland, Clouse, & Lustman, 2001; Collins, Corcoran, & Perry, 2009). Numerous studies have explored the association between type 2 diabetes and the co-occurrence of negative coping styles (Decoster, 2003; Eaton, 2002; Georgiades et al., 2009), symptoms of depression and anxiety (Adriaanse et al., 2008; Collins-McNeil et al., 2007; Kagee, 2008), and mood disorders (Aikens, Perkins, Piette, & Lipton, 2008;

Anderson et al., 2001; Collins et al., 2009; de Groot, Jacobson, Samson, & Welch, 1999). Several studies have established that negative emotions such as fear, anger, and sadness are part of living with the condition (Decoster, 2003; Eaton, 2002; Goldney, Fisher, Phillips, & Wilson, 2004). The mental health of persons with type 2 diabetes is considered so integral a part of effective self-care that the American Diabetes Association (ADA) included regular psychological assessment in its *Standards for Medical Care 2012* (ADA, 2012). In light of the physical and emotional challenges of persons with type 2 diabetes, mindfulness-based interventions have been tested in this population and attributed to lower and better regulated blood sugar levels, lower stress levels, reduced general psychological symptoms and distress (Gregg et al., 2007; Rosenzweig et al., 2007; Rungreangkulkij, Wongtakee, & Thongyot, 2011; Whitebird, Kreitzer, & Conner, 2009).

Mindfulness

Numerous contributions to the understanding of mindfulness have been offered (Baer, 2003; Baer et al., 2008; Bishop, 2002; W. B. Brown & Ryan, 2004). Although aspects of mindfulness are used in mindfulness-based cognitive therapy (MBCT) and dialectical behavior therapy (DBT), mindfulness theory is distinct from these approaches in that the participant's goal is not identifying thoughts or emotions for the purpose of removing or changing them. Rather, Jon Kabat-Zinn (2009) described the goals of mindfulness as developing the ability

> to live life as if each moment was important, as if each moment counted and could be worked with, even if it was a moment of pain, sadness, despair, or fear. This 'work' involves above all the regular disciplined practice of moment-to-moment

> awareness or mindfulness, the complete 'owning' of each moment of your experience, good, bad or ugly. (p. 11)

He elaborated, "[a]ll of us have the capacity to be mindful. All it involves is cultivating our ability to pay attention in the present moment" (p. 11). Kabat-Zinn's definition entails both a *mindful attitude* or approach toward experiences that is accepting, hopeful, and optimistic and a *mindfulness practice* of focusing attention and bringing awareness to the present moment.

Recent studies have focused on the importance of the mindfulness construct as well as the "essential" mindfulness concepts—awareness and acceptance—in the type 2 diabetes self-management process (Gregg et al., 2007; Hernandez, Bradish, et al., 1999; Ingadottir & Hallordottir, 2008). According to Hernandez, Bradish, et al. (1999), becoming an expert in the self-management of diabetes requires learning *body listening*, a process of constantly tuning in to body cues and sensations, *body knowing*, a deep understanding of how the body responds to certain situations, and heightened self-awareness. Ingadottir and Halldorsdottir (2008) suggested that the "disease mastery behaviors" of individuals with diabetes involves a complex process of developing self-awareness and integrating healthy behaviors into the individual's lifestyle. Interestingly, the relevance of awareness, or sensitivity to body cues and sensations, observed by Hernandez, Bradish, et al. (1999) and Ingadottir and Halldorsdottir (2008) bears a striking similarity to mindfulness approaches in their focus on the present moment experience. A mindfulness theory conceptualization of the self-management of diabetes would suggest that when individuals are supported in learning to regulate their attention,

bring awareness to their internal experiences, focus on the present moment, and accept their emotional, cognitive and physical experiences, improvements in the ability to make choices that will contribute to effective management of their diabetic conditions may result.

Given the challenge of treating epidemic numbers of adults with type 2 diabetes and the documented relationship between diabetes and diminished mental health (Rubin & Peyrot, 2001; Nichols & Brown, 2003; Kruse, Schmitz, & Thefeld, 2003), it is critical that counselors increase their exposure to interventions that may be useful in enhancing the lives of the growing population of persons living with diabetes. Whereas higher levels of mindfulness may help type 2 diabetes patients to better manage their conditions, other factors may preclude adherence to treatment regimens. A diabetes specific emotional condition called diabetes-related distress (DRD) has been found to interfere with a patient's ability to follow a self-management regimen (Anderson et al., 2001; Glasgow, Toobert, & Gillette, 2001; Lustman & Clouse, 2005). DRD is the combined emotional distress associated with managing the demands of relationships with family and healthcare providers, regimen recommendations, and the challenge of making lifestyle changes that require daily attention to diet, exercise, and medication. An understanding of DRD is important because it contributes to the understanding of the numerous emotional challenges of those living with type 2 diabetes and how these challenges might interfere with effective diabetes self-management. In light of recent studies exploring mindfulness concepts in the type 2 diabetes population, further research on the specific role of mindfulness and its impact on type 2 diabetes self-management is

warranted. In addition, how this relationship may or may not be impacted by DRD deserves further attention.

Diabetes-related Distress (DRD)

Negative coping styles, depressive symptoms, and the compromised physical, psychological, and social well-being of persons with type 2 diabetes has been well documented in the medical and psychological literature (Adriaanse et al., 2008; Anderson et al., 2001; Boehnert & Popkin, 1986; Collins et al., 2009). A high percentage of persons with type 2 diabetes experience mood disorders (Eaton, 2002; Garfield, 2002; Gonzalez et al., 2008). According to some researchers, the co-occurrence of mood disorders and chronic disease reflects the difficulty of self-regulating emotional responses while managing physical health concerns (Engum, Mykletun, Midthjell, Holen, & Dahl, 2005; Hamilton, Karoly, & Kitzman, 2004).

Although clinical depression does appear in the type 2 diabetes population, and may be a part of DRD, recent investigators have noted that DRD is the more accurate description of the condition that many of these patients experience (L. Fisher, Glasgow, et al., 2008; L. Fisher, Skaff, et al., 2008; L. Fisher et al., 2010). Although similar to clinical depression in its presentation, DRD is distinguished by the frustration, anger, and discouragement that patients with diabetes experience while negotiating the demands of the complex regimens associated with effective self-care and managing the often difficult relationships with healthcare providers and significant others (Polonsky et al., 1995, 2005; L. Fisher, Glasgow, Mullan, Skaff, & Polonsky, 2008). As such, DRD may be a significant barrier to effective type 2 diabetes self-management.

Self-Management

The general guidelines for effective type 2 diabetes self-management include a combination of diet, physical activity, medication, and glucose monitoring recommendations (Standards of Medical Care in Diabetes; ADA, 2012). Experts also recommend weight loss for overweight or obese individuals, foot care due to vein and nerve damage, and routine primary care to make sure that blood sugar levels are being maintained within a healthy range and for assessment of diabetes associated conditions (i.e., cardiovascular disease, kidney damage, retinopathy, and peripheral neuropathy). The current standards for type 2 diabetes self-management recommend that comprehensive care should not end with the physical body; effective type 2 diabetes care should also address the psychological and relational issues that are associated with living with the disease. As discussed in the previous section, diabetes-related distress is a frequent aspect of living with type 2 diabetes; therefore, attention to psychological care is critical (Anderson et al., 2001; Lin et al., 2008; Nichols & Brown, 2003; Rubin & Peyrot, 2001).

The psychological problems related to type 2 diabetes can impair or interrupt the ability to take part in essential self-management tasks such as attending frequent medical visits, procuring adequate medical supplies, frequently monitoring blood glucose levels throughout the day, making immediate adjustments to nutrition and physical activity, and attending to foot care (Polonsky et al., 2005). Further, there are relational issues that cannot be ignored. Individuals managing type 2 diabetes are frequently faced with the dilemmas of negotiating individualized care with their health care providers and

receiving inadequate social support to help them meet the physical and emotional demands of the disease (Gallant, 2003; Penckofer, Ferrans, Velsor-Friedrick, & Savoy, 2007; Rees, Karter, & Young, 2010). According to Liles and Juhnke (2008), medical professionals have begun to adopt the view that managing diabetes requires the perspective that the disease is an intricate physical, mental, and emotional process that involves more than attention to day-to-day decision making behaviors related to diet, exercise, and medication management; in other words, a holistic view of the individual that takes into account emotions and lifestyle is needed.

According to Kate Lorig, a prominent scholar and clinician in the field of chronic disease management, "[y]ou cannot *not* [emphasis added] manage" (Lorig, 2001, p. 36). A person with a chronic disease is always "managing" the daily demands of the condition in a manner that is either consistent or inconsistent with self-care recommendations. The difference between effective and ineffective self-care is an issue of *self*-management. It is commonly understood by the medical community that with the exception of the direst of cases, diabetes related care is undertaken by the individual with the disease. Given the life-style transformation that frequently accompanies the disease, an understanding of the diabetic *self* is key to understanding the potential barriers and supports associated with the management process.

In a meta-analysis of the type 2 diabetes self-management literature, Gomersall, Madill, and Summer (2011) offered a detailed discussion of the *self* that is generally referenced in type 2 diabetes management. The authors found that health care providers are responsible for empowering and facilitating the management behaviors of the

diagnosed individual. Implicit to the perspectives of Lorig (2001) and Gomersall et al. (2011) is the understanding that the clinician working with the person diagnosed with type 2 diabetes should begin with an understanding of the individual experience. Consistent with this notion is a line of studies that explored the role of awareness in successful type 2 diabetes management (Hernandez, Antone, & Cornelius, 1999; Hernandez, Bradish, et al., 1999; Ingadottir & Halldorsdottir, 2008). These studies (which will be discussed in greater detail in Chapter II) examine *The Hernandez Theory of Integration*, an explanation of the development of diabetes self-management that incorporates "tuning in" to subtle body cues, "knowing" one's body, and the development of heightened awareness. In addition to awareness, acceptance as a mindfulness related concept has also been implicated in the effective self-management of type 2 diabetes (Gregg et al., 2007).

Statement of the Problem

In 2009, the World Health Organization reported that poor management of treatment regimens of persons with chronic diseases was extensive, of worldwide scope, and cited the prevalence of chronic diseases as "one of the major health challenges to global development in the coming century" (World Health Organization, p.33). One reason for the numerous poor health outcomes associated with type 2 diabetes (e.g., high mortality rates, cardiovascular disease, kidney disease, blindness, and lower-limb amputations) is the chronic nature of the disease. In order to remain healthy, people with type 2 diabetes are challenged to maintain their motivations to monitor diet, medications, exercise, glucose levels, and body weight for the rest of their lives. Persons with diabetes

have been found to be less physically active, less likely to follow their dietary regimens, less likely to take prescribed medications, and less likely to comply with their diabetes self-care plans given the burden of often complex treatment recommendations (Surwit, Schneider, & Feinglos, 1992). This lack of long-term self-management of these complex factors contributes to patients' stress loads, treatment burden, and general difficulty maintaining their self-care plans. In addition, new approaches for treating chronic disease are needed as growing evidence suggests that addressing symptoms of diabetes from a strictly didactic model (i.e., increasing patient knowledge of the most common disease symptoms, stressing the importance of regularly monitoring of glucose levels, and evaluating and adjusting medication dosages) without an understanding of the contextual and emotional factors of people living with the disease are often marginally effective. Type 2 diabetes is a psychologically and behaviorally demanding disease; therefore, psychological approaches that develop the individual's internal resources for coping with type 2 diabetes related stressors and positively influencing self-management behaviors are desirable (Delameter et al., 2001). One such approach includes training patients in mindfulness; however, further research is needed to establish a firmer relationship between mindfulness and diabetes self-management.

The use of mindfulness based approaches and treatment of chronic mental and physical illnesses has been extensively explored in the medical and psychology literature (W. B. Brown & Ryan, 2003; Edelman et al., 2006; Grossman, Niemann, Schmidt, & Walach, 2004). To date, however, no study has empirically explored the relationships among mindfulness and its specific components, awareness and acceptance, diabetes-

related distress, and diabetes self-management. In addition, no researchers have examined the role of diabetes-related distress as a potential mediator of the relationship between mindfulness and diabetes self-management, awareness and diabetes self-management, and acceptance and diabetes self-management. The current study proposes to address these gaps in the type 2 diabetes literature.

Purpose of the Study

The purpose of the current study is threefold: (a) explore the relationships among mindfulness, the mindfulness-related concepts awareness and acceptance, diabetes-related distress, and type 2 diabetes self-management, (b) explore if diabetes-related distress mediates the relationship between mindfulness, awareness, acceptance, and type 2 diabetes self-management (see Figures 1-3), and (c) explore how socio-demographics such as age, gender, and income level impact type 2 diabetes self-management. Numerous studies have documented the significance of mindfulness-based interventions in sub-clinical (Astin, 1997; Shapiro, Schwartz, & Bonner, 1998) and clinical populations (McCracken, Gauntlett-Gilbert, & Vowles 2007; Shennan, Payne, & Fenlon, 2011; Witkiewitz, Marlatt, & Walker, 2005). Recent studies have indicated that mindfulness-based therapies are effective at reducing the suffering of those diagnosed with depression and anxiety and improving the quality of life of those diagnosed with other types of chronic mental and physical conditions (Allexandre, Fox, Golubic, Morledge, & Fox, 2010; Barnes, Gregoski, Tingen, & Treiber, 2010; Beckerman & Corbett, 2010). It also is significant that with the international rise in type 2 diabetes diagnoses there have been recent developments in the research of mindfulness based interventions within the type 2

diabetes population (Gregg et al., 2007; Rosenzweig et al., 2007; Rungreangkulkij et al., 2011; Whitebird et al., 2009). This study will further contribute to the current body of literature by clarifying the role that mindfulness and DRD play in diabetes self-management. Additionally, the current study will shed light on the possible mediating role that DRD plays between mindfulness, awareness, acceptance, and diabetes self-management. The hypothesized mediating models are illustrated in Figures 1-3.

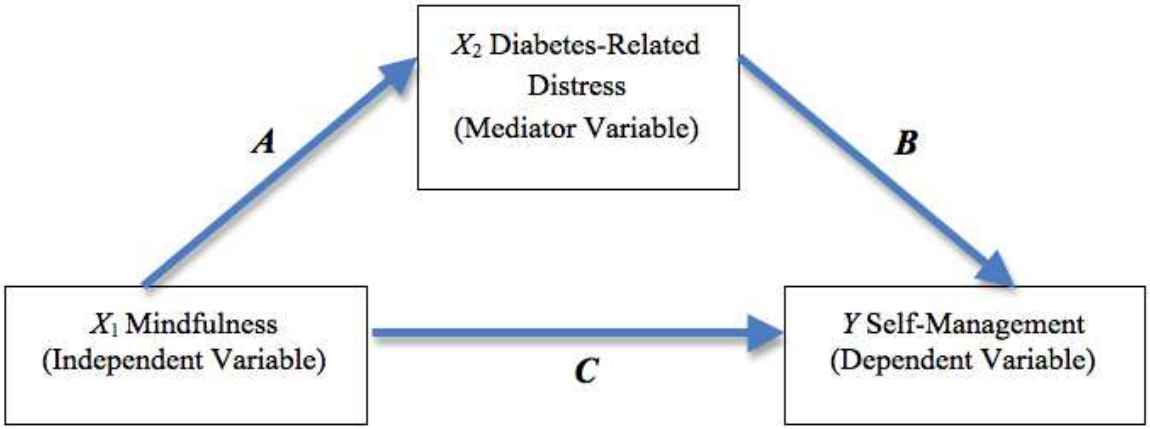

Figure 1. Hypothesized mediator model, Mindfulness Independent Variable.

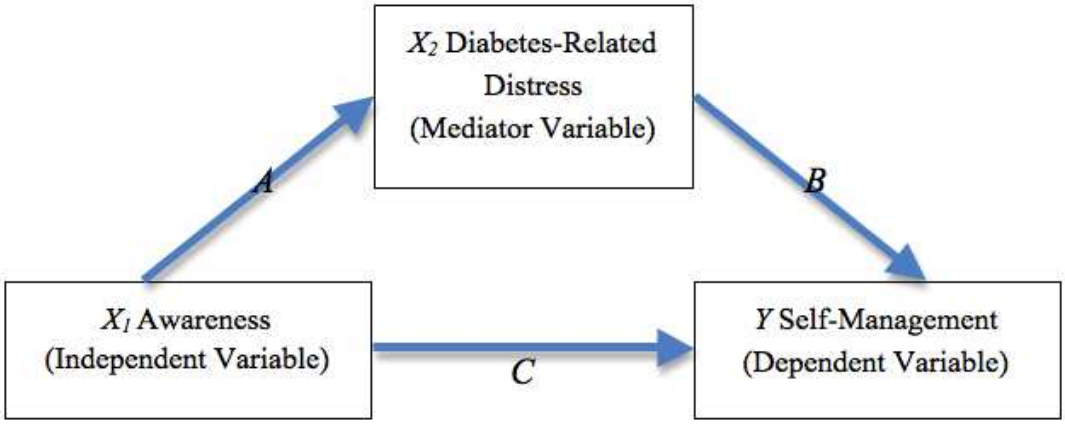

Figure 2. Hypothesized mediator model, Awareness Independent Variable.

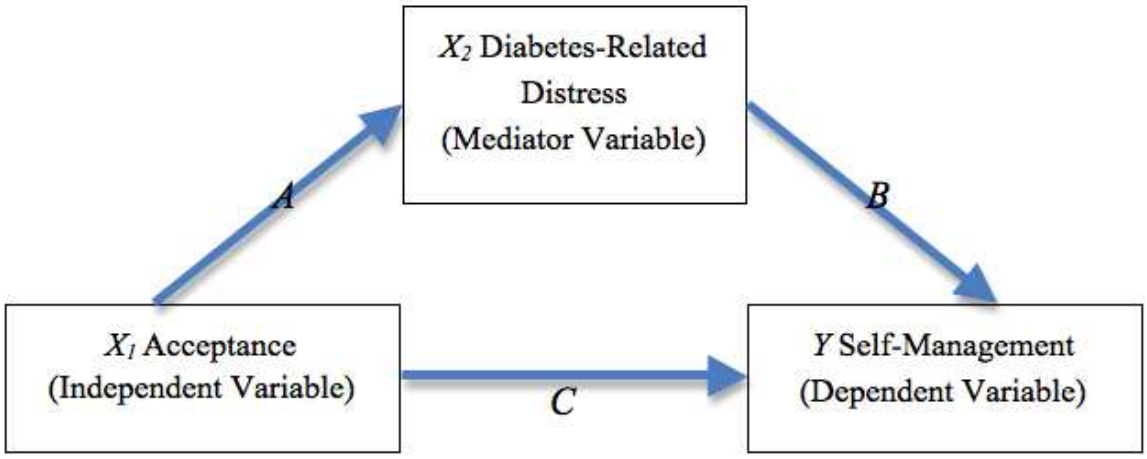

Figure 3. Hypothesized mediator model, Acceptance Independent Variable.

The mediation models are hypothesized in order to clarify the relationships between the independent variables, mindfulness, awareness, and acceptance, and the dependent variable, self-management. The mediation models illustrate that the relationships between the independent variables and the dependent variable are not direct. Instead, the mediation models propose that the independent variables (i.e., mindfulness, awareness, and acceptance) influence the mediator variable (i.e., DRD), which in turn influences the dependent variable (i.e., self-management). DRD is a construct that incorporates the emotional, relational, and regimen related challenges of living with diabetes. As such, the hypotheses are based on the rationale that DRD would intercede in the relationships between mindfulness-self-management, awareness-self-management, and acceptance-self-management.

Figures 1, 2, and 3 represent the hypotheses that an individual's degree of mindfulness, awareness, or acceptance are independent variables that directly influence the extent that the individual is able to successfully self-manage type 2 diabetes (path *C*

in the diagrams). However, DRD functions as a mediator in the relationship between mindfulness, awareness, and acceptance, and diabetes self-management. Therefore, DRD is hypothesized to contribute to the initial effects of mindfulness, awareness, or acceptance on diabetes self-management.

Of particular interest to the researcher is the impact that selected socio-demographic variables, especially income level, have on type 2 diabetes self-management. It has been reported that type 2 diabetes diagnoses, medical care, and self-management education amongst low income individuals may be delayed for significantly longer periods of time after onset compared to individuals with higher incomes (K. M. Nelson, Chapko, Reiber, & Boyko, 2005). Further, because low-income and low education attainment frequently intersect, diagnosed individuals of lower income groups may be limited in their abilities to benefit from diabetes education interventions due to illiteracy and lower access to diabetes education programs (Shawver & Cox, 2000). Individuals from lower income groups may differ from higher income groups in their prior knowledge and understanding of the disease and have significant barriers to engaging in positive self-management behaviors (R. H. Cox, Carpenter, Bruce, Poole, & Gaylord, 2004).

The financial costs of obtaining primary and specialist healthcare, blood sugar testing supplies, medications, and healthier foods required for effective self-management are significant. Due to the financial costs of effectively managing type 2 diabetes, the current study was designed, in part, to determine to what extent the effective self-management of type 2 diabetes is determined by personal income. Because the type 2

diabetes literature indicates that the consumption of healthy food choices and participation in physical activity are important factors in type 2 diabetes self-management, this study will explore the extent to which income level—as a predictor of access to healthy food options and environment conducive to physical activity—explains type 2 diabetes self-management. This study will add to the current literature by examining income level and its relation to diabetes self-management.

The bodies of research covering mindfulness, mindfulness-based awareness and acceptance, diabetes-related distress (DRD), and the self-management of type 2 diabetes are extensive; however, to date these concepts have not been explored together and have received minimal attention in the counseling literature. Due to the current and projected numbers of persons affected by type 2 diabetes and the likelihood that those diagnosed with the disease will also experience mental health challenges associated with the disease, it is likely that counselors in community settings will work with clients who have type 2 diabetes. The results from this study may confirm for counselors the importance of mindfulness as a key factor in promoting more effective diabetes self-management and help counselors to better understand how DRD and socio-demographic variables also influence this process.

Research Questions

This study was designed to address the following research questions:

Research Question 1: What are the relationships among mindfulness, awareness, acceptance, diabetes-related distress, and self-management behaviors among adults with type 2 diabetes?

Research Question 1a: What is the relationship between mindfulness and self-management behaviors among adults with type 2 diabetes?

Research Question 1b: What is the relationship between awareness and self-management behaviors among adults with type 2 diabetes?

Research Question 1c: What is the relationship between acceptance and self-management behaviors among adults with type 2 diabetes?

Research Question 1d: What is the relationship between diabetes-related distress (DRD) and self-management behaviors of adults with type 2 diabetes?

Research Question 2: Do mindfulness, awareness, acceptance, and diabetes-related distress explain a significant portion of variance in diabetes self-management among adults with type 2 diabetes?

Research Question 3: How does diabetes-related distress mediate the relationship between total mindfulness, and diabetes self-management, awareness and diabetes self-management, and acceptance and diabetes self-management?

Research Question 4: After controlling for mindfulness, awareness, acceptance, and diabetes-related distress, how do socio-demographics such as age, gender, income level, access to healthy foods, and access to physical activity further predict type 2 diabetes self-management?

Definition of Terms

Mindfulness

For purposes of this study, mindfulness will be defined consistent with the operational definition provided by Bishop et al. (2004) as ". . . a process of regulating

attention in order to bring a quality of nonelaborative awareness to current experience and a quality of relating to one's experience within an orientation of curiosity, experiential openness, and acceptance" (p. 234). The mindfulness components, acceptance and awareness, subsumed in the Bishop et al. (2004) definition will also be a focus of this study because of their prominence in the mindfulness literature, and because the type 2 diabetes literature suggests the potential significance of awareness and acceptance in promoting to effective diabetes self-management.

Awareness. The definition of awareness that will be used in this study is the ability to attend to internal and external events that exist at any given moment (W. B. Brown & Ryan, 2004).

Acceptance. The definition of acceptance that will be used in this study is an attitude of openness and nonjudgment toward experience and the absence of the avoidance of negative thoughts and feelings (Hayes, Strosahl, & Wilson, 1999; Gregg et al., 2007).

Diabetes-related Distress (DRD)

Diabetes-related distress is a multi-faceted construct consisting of 4 domains (emotional burden, physician-related distress, regimen-related distress, and interpersonal distress) that describe the psychosocial demands associated with living with diabetes (Polonsky et al., 2005). Diabetes-related distress includes the diabetes related emotions (e.g., frustration, anger, discouragement, generally feeling overwhelmed, etc.), diabetes related conflict with health care providers, stress related to compliance with the variety of regimen recommendations, and diabetes related conflict with social supports.

Diabetes Self-Management

Diabetes self-management includes the most frequently cited treatment recommendations including combinations of diet, physical exercise, self-monitoring of blood and urine glucose levels, use of medications targeted at improving glucose metabolism, and foot care (ADA, 2012; Toobert, Hampson, & Glasgow, 2000). Despite the most common recommendations for type 2 diabetes treatment management, it is widely recognized by type 2 diabetes clinicians and researchers that effective type 2 diabetes management requires an individualized treatment regimen. In light of the individualized nature of type 2 diabetes treatment, Weinger, Butler, Welch, and La Greca (2005) defined self-management within the context of type 2 diabetes as "the daily regimen tasks that the individual performs to manage diabetes" (p. 1346). For the purposes of this study, type 2 diabetes self-management will be defined consistent with Weinger et al. (2005).

Income Level

The following income levels have been defined for the study and will be analyzed as a continuous variable: (1) $0-9,999, (2) $10,000-19,000, (3) $20,000-29,000, (4) $30,000-39,000, (5) $40,000-49,000, (6) $50,000 and above.

Access to Healthy Foods

The American Diabetes Association (ADA) no longer makes specific dietary recommendations. However, those who are diagnosed with type 2 diabetes are encouraged to eat a balanced diet of lean meat, nonfat dairy, fruits, vegetables, whole grains, and unsaturated fats. In addition, patients are encouraged to adjust carbohydrate

intake according to blood glucose readings and monitor portion size and total calorie intake if weight loss has been recommended. For the purposes of this study, "access" to recommended foods is defined as total daily access (7 days a week), moderate daily access (4-6 days a week), minimal daily access (1-3 days a week), or no daily access (0 days a week).

Access to Physical Activity

The American College of Sports Medicine and the ADA have recommended that those with type 2 diabetes engage in at least 150 minutes a week of moderate to vigorous aerobic exercise over the course of three days of the week, with no more than two consecutive days of aerobic activity (ADA, 2010). Strength training is believed to be as beneficial and potentially more beneficial, and those who are diagnosed are encouraged to incorporate resistance training into their exercise routines. For the purposes of this study, "access" to physical activity has been defined as all or no access to at least one outlet for physical activity such as walking, riding a bicycle, swimming or gardening.

Social Support

The role of the social environment in the management of chronic disease has been widely studied in various populations (Gallant, 2003; Koenig, Westlund, George, Hughes, & Hybels, 1993). Due to the significant challenges and complications associated with daily type 2 diabetes self-management, it has been reported that social support may be particularly relevant for the type 2 diabetes population (Barrera, Toobert, Angell, Glasgow, & MacKinnon, 2006; Carter-Edwards, Skelly, Cagle, & Appel, 2004; Chlebowy, & Garvin, 2006; van Dam et al., 2005). For the purposes of this study social

support is defined as both the number of social relationships, the number of significant social interactions, and the perceived quality of the social relationships (Wardian, Robbins, Wolfersteig, Johnson, & Dustman, 2013).

Need for the Study

Given the staggering numbers of persons with type 2 diabetes, the projections of the worldwide development of type 2 diabetes, and the mental and physical complications associated with the disease, it is clear that type 2 diabetes is one of the most serious health conditions of our time. The acute and progressive nature of type 2 diabetes will continue to be a priority for health care professionals for years to come; therefore, trained physical and mental health care professionals will continue to be needed to assist individuals in the self-management of this condition.

Because of the vast numbers of persons currently diagnosed with type 2 diabetes, there is a need for counselors to know how to work with this population and a need for counselor educators to be aware of the importance of training counselors and other health care professionals to work effectively with this rapidly growing population. As mental health care professionals, counselors are well situated to address the need to improve health outcomes of patients living with chronic illness by offering emotional support, identifying personal and systemic barriers to change, facilitating collaborative goal setting, and providing interventions that are intended to increase awareness, acceptance, and behavioral change. According to Snoek (2006), quality diabetic care should include listening, empathy, demonstration of respect, as well as the use of more specialized interventions tailored for the complex psychological challenges faced by many

individuals with type 2 diabetes— skills that counselors are well trained to implement. Whereas it is clear that a thorough understanding of the behaviors required for effective diabetes self-management is necessary for every person diagnosed with the disease, the integration of experiential treatment approaches, such as mindfulness, may help persons with diabetes cope with the emotional distress associated with the disease and contribute to their knowledge of self, resulting in more effective type 2 diabetes self-management outcomes. As such, the results of this research may encourage promising counseling interventions designed to enhance mindfulness and decrease levels of diabetes-related distress. However, the relationships between these variables and diabetes self-management are as of yet unknown.

Brief Overview

This study is presented in five chapters. Chapter I provided an introduction to type 2 diabetes, mindfulness, mindfulness-based awareness and acceptance, diabetes-related distress (DRD), and diabetes self-management followed by the statement of the problem, the purpose of the study, the research questions, the need for the study, and the definition of terms. Chapter II provides a review of the literature related to type 2 diabetes, mindfulness, with special attention to awareness and acceptance, DRD, and the most prominent theories and models relevant to the self-management of chronic disease conditions. The theories and models specific to type 2 diabetes self-management will also be discussed. Chapter III provides the methodology that will be used in this study, including the participants, procedures, instruments, data analyses, and results of the pilot study. Chapter IV presents the results of this study with particular reference to the

hypotheses and research questions. The final chapter, Chapter V, will include a summary of the study, a discussion of the results and how findings relate to the extant research, implications for counseling practice, a discussion of the study's limitations, and suggestions for further research regarding persons with type 2 diabetes.

CHAPTER II

REVIEW OF THE LITERATURE

In this chapter, an overview of the history and development of type 2 diabetes followed by the demographic and environmental epidemiology of type 2 diabetes is provided. Mindfulness is discussed from theoretical and clinical research perspectives and presented as an experiential alternative for meeting the challenges associated with type 2 diabetes, with particular attention to the individual's the ability to develop awareness and acceptance of emotions and cognitions. The emotional challenges associated with the disease and the dynamics of diabetes-related distress (DRD) are explored. The theories and models related to chronic disease self-management and specific to type 2 diabetes self-management are reviewed. Finally, the conclusion provides a summary of the research and the need for further study of the relationships between mindfulness, awareness and acceptance behaviors, DRD, and diabetes self-management.

History and Development of Type 2 Diabetes

This section provides a brief overview of the history and development of type 2 diabetes. An explanation of how type 2 diabetes is acquired and how it progresses contributes to the understanding of how significant damage occurs to the internal organs and why effective self-management of the disease is necessary. Key definitions

associated with the condition, the role of the pancreas, the cycle of insulin resistance, and the underlying cause of diabetes related organ damage are explained.

Healers and medical practitioners have recorded the symptoms, concerns and beliefs regarding the etiology of type 2 diabetes for thousands of years (Narayan et al., 2011). Dating back to 1550 B.C. writers of the Egyptian Ebers papyrus characterized the condition as one of frequent urination. In the first century A.D., Greek physician Arataeus described the illness as a "melting down of flesh and limbs into urine." Indian writers of the fifth and sixth century A.D. took note of the "sweet" quality of sufferers' urine. In the 17th century, English physician Thomas Willis also noted the sweet quality of patients' urine and that the condition appeared to be increasing in frequency in his patients. Whereas the presence of sugar in the urine was common to those with the mysterious disease, most troubling to early observers was the discovery that those diagnosed with the condition tended to die prematurely.

Modern medicine has clarified that the frequent urination and sweet urine noticed by early practitioners is caused by a prolonged state of hyperglycemia (i.e., high blood sugar) caused by impaired glucose (i.e., blood sugar) metabolism. Insulin, a hormone produced by the pancreas, is responsible for allowing the cells of the body to adequately metabolize glucose, thereby converting blood sugar into energy. In the case of individuals with type 1 diabetes, the pancreas does not produce insulin. In the case of type 2 diabetes, the pancreas produces insulin, but the process of glucose metabolism is impaired. In optimal glucose metabolism, glucose enters the bloodstream, and the pancreas responds by producing insulin that enables the cells of the body to absorb the

glucose needed for energy. In persons with type 2 diabetes glucose collects in the blood because the cells do not absorb it properly. The pancreas, in turn responds by producing more insulin. The cells of the body respond to this overproduction of insulin by becoming *insulin resistant* (i.e., failure to respond to the available insulin in the blood) which results in dangerously high blood sugar levels. The pancreas responds to the high blood sugar levels by producing even more insulin. The increased production of insulin can eventually cause irreversible damage to the pancreas. This cycle of insulin resistance and resulting damage to the pancreas causes blood glucose levels to become dangerously high. The resulting high blood glucose causes nerve damage and loss of nerve connectivity which leads to the numerous disabling and life threatening health conditions associated with type 2 diabetes (e.g., cardiovascular disease, vascular dementia, kidney disease, diabetic retinopathy and blindness, peripheral neuropathy which causes pain and numbness in the feet and legs, impaired healing of wounds, and lower-limb amputations) (Beeri et al., 2004; Hassing et al., 2002).

An explanation of the development and progression of type 2 diabetes provides a background for understanding why poorly managed diabetes is potentially devastating. Because of the debilitating effects of type 2 diabetes, it is important for researchers and clinicians interested in the prevention and treatment of the condition to understand the most significant demographic and environmental variables that are associated with its onset. In the next section, the most prominent of demographic and environmental factors related to type 2 diabetes are discussed.

The Epidemiology of Type 2 Diabetes

The epidemiology of Type 2 diabetes provides a glimpse into the scope of the problem across demographic and environmental variables. To better understand this condition and the association between type 2 diabetes self-management, total mindfulness, awareness, acceptance, and emotional state, it is helpful to explore the scope of type 2 diabetes in light of its most prominent epidemiological factors. In this section, the most commonly studied demographic factors associated with type 2 diabetes including age, gender, ethnicity, genetics, obesity, and socioeconomic status (SES) will be examined. The physical and social environmental factors most commonly associated with the ability to effectively self-manage and increased risk of disease—restricted access to healthful food choices and physical activity and insufficient social support—will also be discussed.

Demographic Factors

Age. Type 2 diabetes has traditionally been called a disease of middle age because the greatest percentage of diagnoses to date has occurred in persons over the age of forty (CDC, 2012). In 2010, 4.6% of the American population aged 18–44, 13.5% aged 45-64, and 12.4% aged 65-79 were diagnosed with type 2 diabetes (CDC, 2012). Between 2005 and 2008, 35% of American adults 20 years or older had Impaired Fasting Glucose (IFG), an indicator of pre-diabetes and a significant risk factor for the development of type 2 diabetes (CDC, 2011).

Despite the occurrence of type 2 diabetes in persons over age 40, it is important to note that the condition is no longer considered primarily a disease of the middle aged.

There is an emerging trend of diagnosis among persons under the age of twenty (Bindler & Bruya, 2006; Hannon, Rao, & Arslanian, 2005). It was estimated that 7% or about 2 million adolescents (12-19 years) had elevated impaired fasting glucose levels (IFG) between 1999 and 2008, predisposing them to a diagnosis of type 2 diabetes during adolescence or early adulthood (American Diabetes Association [ADA], 2010; National Institutes of Health [NIH], 2008). The lowered age of diagnosis has been attributed to the rising incidence of childhood and adolescent obesity (Farhat, Iannotti, & Simons-Morton, 2010; Van Cleave, Gortmaker, & Perrin, 2010; Delameter et al., 2001). Prevalence in ethnic minority youth and elderly is of particular concern, with a general trend of younger diagnoses amongst minority youth and rates exceeding 30% in the elderly minority populations (Geiss & Cowie, 2011).

Gender. There are roughly equal numbers of men and women with type 2 diabetes in the United States (11.8 percent or 13 million men 20 years of age and older compared to 10.8 percent or 12.6 million women 20 years of age and older; Centers for Disease Control [CDC], 2011). Between 1980-2011, type 2 diabetes was slightly more prevalent in White men (12.3% of WM 45-64, 22.8% of WM 65-74, and 21.7% of WM ≥75; age-adjusted total, 7.0%) than in White women (10.0% of WW 45-64, 18.4% of WW 65-74, and 16.6% of WW ≥ 75; age-adjusted total, 6.3%; CDC, 2013). The disease is also more prevalent in African American men (17.6% of AAM 45-64, 30.7% of AAM 65-74, and 38.1% of AAM ≥ 75; age-adjusted total, 9.9%) than in African American women (17.1% of AAW 45-64, 31.2% of AAW 65-74, and 25.9% of AAW ≥ 70; age-adjusted total, 9.0%; CDC, 2013). Despite the slight differences in prevalence between

men and women, type 2 diabetes is considered more problematic in women because women suffer from more serious disease related complications. It is estimated that ten million women have been diagnosed with diabetes in the United States, and nearly 65% of those women will die from diabetes related complications such as stroke and cardiovascular disease (Mathews, Peden, & Rowles, 2009). Heart disease is considered one of the more serious complications of type 2 diabetes for men and women; however, women with the disease who have suffered heart attacks experience lower survival rates and poorer quality of life than men (CDC, 2001). Also, women have a higher risk of blindness as a consequence of their type 2 diabetes (CDC, 2001). Because women have a longer lifespan than men on average, it is suggested that women suffer more from long-term diabetes related complications and disabilities caused by heart failure, blindness, and amputations. The cumulative psychological and financial burden of diabetes across the life-span may also be greater in women than in men because of increased longevity in women, and women continue to assume primary caregiver roles and experience greater sensitivity to the high cost of diabetes care (Hartman-Stein & Reuter, 1988).

Ethnicity. A review of demographic statistics indicates that type 2 diabetes prevalence is increasing across all ethnic groups; however, the disease disproportionately burdens ethnic minorities (Geiss & Cowie, 2011; Magwood, Zapka, & Jenkins, 2008; Robbins, Vaccarino, Zhang, & Kasl, 2001; Samuel-Hodge, Watkins, Rowell, & Hooten, 2008). Ethnic minorities are most burdened by the disease, with a marked presence in Native American, African American, Hispanic American, and Asian American and Pacific Islandic communities (CDC, 2011).

Native Americans. Type 2 diabetes has been recognized as a major public health concern for Native American communities since the 1970s (CDC, 2011). Native Americans are diagnosed with type 2 diabetes 2.2 times more often than their non-Hispanic, White counterparts (Pavkov, Narayan, Nelson, Hanson, & Knowler, 2008). The prevalence varies across Native American tribes with the Pima Indians of Arizona reported as having the highest recorded prevalence of type 2 diabetes in the world (50-60 % of the adult population; Lemley, 2008; Valencia et al., 2005). A survey of recipients of health care provided by the Indian Health Service (IHS) indicated that 14.2 % of Native Americans and Alaskan Natives 20 years of age and older were diagnosed (CDC, 2011). After adjusting for population age differences, it was estimated that 16.1 % of the total adult population served by the IHS had been diagnosed with the disease (CDC, 2011).

African Americans. African Americans have the second highest rate of type 2 diabetes diagnoses among ethnic minority populations. It was estimated that 4.9 million or 18.7 % of non-Hispanic African Americans aged 20 years or older had diagnosed or undiagnosed type 2 diabetes in 2010 (CDC, 2011). After adjusting for population age differences, it was estimated that 9.3 % of African Americans had been diagnosed with the disease between 1980 and 2011 (CDC, 2013). Between 1980 and 2011, the age-adjusted prevalence amongst African Americans increased 148% (from 4.0% to 9.9%) among males, and 84% (from 4.9% to 9.0%) among females (CDC, 2013). African Americans also exhibit higher rates of morbidity and mortality associated with their diabetic conditions than other ethnic groups (Chou et al., 2007; Correa-de-Araujo,

McDermott, & Moy, 2006; de Groot & Lustman, 2001; Georgiades et al., 2009; Lavery, Van Houtum, Ashry, Armstrong, & Pugh, 1999).

Hispanic Americans. Hispanic Americans have the third highest rate of type 2 diabetes diagnoses among ethnic minority populations (preceded by Native Americans and African Americans). Hispanic Americans have a risk of diagnoses 66% higher than non-Hispanic Whites. The prevalence rate for persons 45-64 years of age is 17.9%, 65-74 years of age is 31.9%, and 75 years of age and older is 32.4% (CDC, 2013). Just under 12% (11.8 %) of Americans of Hispanic origin had been diagnosed with type 2 diabetes, including 10.1 % of persons of Puerto Rican descent, 10.0 % of persons of Mexican descent, and 7.3 % of persons of Cuban descent (CDC, 2011, 2013). Data collected by the Hispanic Health and Nutritional Examination Survey (HANES) mirrored the CDC findings; Cuban men and women between 45-74 in south Florida reported the lowest diagnosed and undiagnosed rates at 15.8%, followed by Mexican Americans (23.9%), and Puerto Ricans in New York City (26.1%). In addition to high prevalence rates, a 1999-2002 survey conducted by the National Health and Nutrition Examination Survey (NHANES) indicated that Hispanics also have high rates of impaired fasting glucose (IFG) (32% compared to 26.1% in Whites), an indicator of pre-diabetes and a significant risk factor for developing the full diagnosis (Geiss & Cowie, 2011).

Asian Americans. From 1997 to 2011, the age-adjusted prevalence amongst Asian Americans increased 81% (from 4.3% to 7.8%) among men and 49% (from 3.7% to 5.5%) among women (CDC, 2013). According to data collected by Medicare (one of the few national health organizations that compile data regarding Asian Americans), the

age and sex adjusted prevalence of type 2 diabetes in Asians was 24.3% compared to 18.4% in Whites. The rate of type 2 diabetes for Asian North Americans is approximately 1.3-1.4 times higher than the rates for Whites (McNeely & Fujimoto, 2008). There are few studies that compare the prevalence rates of Asian subgroups; however, there is some data that suggests that Filipinos and multi-racial Asians have higher prevalence rates than other Asian subgroups (Gomez, Kelsey, Glaser, Lee, & Sidney, 2004).

Caucasian Americans. The literature indicates a higher prevalence amongst ethnic minorities; however, diagnoses amongst non-Hispanic Whites is also considered epidemic in scale (Arcury, Skelly, Gesler, & Dougherty, 2005; Kirk et al., 2006). In 2010, there were an estimated 15.7 million or 10.2% of non-Hispanic Whites aged 20 years and older with diagnosed or undiagnosed type 2 diabetes (CDC, 2011). After adjusting for age differences in the population, it was estimated that 5.9 % of the non-Hispanic White population had been diagnosed with the disease (CDC, 2013). From 1980 to 2011, the age-adjusted prevalence increased 160% (from 2.5% to 6.5%) among men and 108% (from 2.6% to 5.4%) among women, 148% (CDC, 2013). As is the case in ethnic minority groups, the highest prevalence rates amongst White Americans appear to be clustered amongst low-income groups.

Genetics. The prevalence of type 2 diabetes among ethnic minorities has been attributed to several factors. The role of genetics as a significant determinant in the diagnosis of type 2 diabetes cannot be understated (Banerji & Lebovitz, 2008; Klein, Klein, Moss, & Cruickshanks, 1996; T. Nelson, Perez, Alcaraz, Talavera, & McCarthy,

2007). In the case of Native Americans, African Americans, Hispanic Americans, and Asian Americans, there is substantial evidence that there is a genetic predisposition for the insulin resistance and lower insulin secretion that sets the stage for impaired glucose metabolism (Baxter & Hamman, 2008; Lyssenko et al., 2008; Undlien et al., 1997). Despite the role of genetics, type 2 diabetes is considered a *complex polygenic* or *multifactorial* disease; genetic composition alone does not determine one's lifetime risk for the disease. Genetic susceptibility is a requirement for individuals who are ultimately diagnosed; however, all persons with the genetic predisposition do not acquire the disease. An individual's genetics must be triggered by exposure to environmental factors such as high caloric intake and lack of physical exercise (Ahlqvist, Ahluwalia, & Groop, 2011).

Obesity. Obesity and high Body Mass Index (BMI) are associated with significant health risks including type 2 diabetes, hypertension, high cholesterol, stroke, heart disease, arthritis, and some types of cancer (CDC, 2011). Although obesity is directly related to diagnosis (Okosun et al., 2001), recommendations to lose weight by changing nutrition, physical activity, and lifestyle habits often prove to be difficult if not overwhelming for most affected persons (Gazmararian, Ziemer, & Barnes, 2009). The challenge of losing weight is compounded by cultural values and practices around eating and physical activity, which the literature indicates is especially true for members of ethnic minority groups (Arcury et al., 2005; Babamoto et al., 2009; Banks-Wallace, 2000; Lawton, Ahmad, Hanna, Douglas, & Hallowell, 2006; Samuel-Hodge et al., 2008).

Socio-economic status (SES). Numerous studies have documented the relationship between SES and poorer health outcomes (Adler, Boyce, Chesney, & Folkman, 1993; Lynch, Kaplan, & Salonen, 1997; Marmot, Kogevinas, & Elston, 1987). The trend is demonstrated with type 2 diabetes as several studies have indicated that the disease is more prevalent in lower-wealth communities (de Groot, Auslander, Williams, Sherraden, & Haire-Joshu, 2003; Everson, Maty, Lynch, & Kaplan, 2002; Robbins et al., 2001). Ockleford, Shaw, Willars, and Dixon-Woods (2008) cited a World Health Organization (WHO) report indicating that diabetes related mortality is most often associated with low to medium wealth countries; however, it is projected that the rates in medium wealth countries will rise by 80% by the year 2015. Generally, lower wealth communities experience lesser access to healthy food choices, fewer safe outlets for physical activity, and lesser access to healthcare. It has been theorized that the cumulative burden of the stressors found in lower wealth communities subjects those who are poor to severe and chronic stress, a contributor to impaired glucose metabolism. A lifestyle characterized by chronic stress may subject individuals to other unhealthy behaviors such as smoking, higher alcohol consumption, poor diet, and inactivity (Everson et al., 2002).

The Physical and Social Environment

Although a genetic predisposition toward type 2 diabetes is necessary, environmental considerations are the most significant and controllable risk factors associated with the disease. One such environmental consideration includes barriers posed by deficits in the built environment such as food deserts and the absence of

walkable neighborhoods. A second environmental consideration includes social barriers such as food insecurity, cultural norms that do not include regular physical exercise, and inadequate social support. These barriers and their relevance to the type 2 diabetes population will be discussed in the next section.

Food deserts. The accessibility of healthy food choices is considered integral to preventing and effectively managing type 2 diabetes. Despite the recognized importance of making low-fat, complex carbohydrate, and high-quality protein food choices, significant barriers exist to making food choices that support the effective management of the condition. One of the barriers, for a significant number of those affected by type 2 diabetes, is the inaccessibility of healthy food options posed by the built environment. Numerous studies underscore the fact that fundamental differences in the physical environment contribute to differences in the development of disease and the creation of observable health disparities between populations (Gordon-Larsen, Nelson, Page, & Popkin, 2006). The term "food desert" has been used to describe poor, urban neighborhoods where residents cannot buy affordable and healthy foods because of the number, size, and type of food stores generally found in these areas and because of the type and quality of food stocked in the stores that are present (Cummins & Macintyre, 2002; Hendrickson, Smith, & Eikenberry, 2006; Walker, Keane, & Burke, 2010).

A 2007 study conducted by the California Center for Public Health Advocacy found that there is a positive association between the quality of the retail food environment and the prevalence of obesity and diabetes in California (California Center for Public Health Advocacy, PolicyLink, and the UCLA Center for Health Policy

Research, 2008). The researchers calculated a Retail Food Environment Index (RFEI) score for each adult respondent. RFEI is an indicator of the density of food outlets less likely to stock fresh produce and other healthy foods. A higher RFEI score indicates that an individual lives in a closer proximity to more fast food restaurants and convenience stores than grocery and produce stores; an REFI = 2.0 indicates that an individual has 2 times as many fast food restaurants and convenience stores as grocery and produce stores. The results demonstrated that 1 in 4 adults with REFI scores of ≥ 5.0 were obese, compared to 1 in 5 adults with REFI scores of ≥ 3.0, representing a 20% difference in obesity between the two groups. Approximately 8% of adults with RFEI scores of ≥ 5.0 had been diagnosed with diabetes, compared with 6.6% of those with scores < 3.0, representing a 23% difference between high and low RFEI groups. Not surprisingly, fast food and convenience store presence was positively associated to average community income; the mean RFEI was 20% higher for people living in lower-income communities.

Because the median income in urban neighborhoods in the United States is lower than the median income of suburban neighborhoods, individuals who suffer the impact of food deserts typically have lower incomes and less transportation than their counterparts living in suburban areas (Hendrickson et al., 2006; Lewis et al., 2005; Moore & Diez Roux, 2006; Powell, Slater, Mirtcheva, Bao, & Chaloupka, 2007; Rose & Richards, 2004). The residents of food deserts also have been found to be predominately African American and Latino (Block & Kouba, 2006; Lewis et al., 2005; Moore & Diez Roux, 2006; Powell et al., 2007; Raja, Ma, & Yadav, 2008). Because people who live in food deserts do not have access to supermarkets and on average have lower household

incomes, they are more susceptible to the restricted choices containing higher fat, sugar, and sodium content that are offered by the gas stations, curb markets, convenience stores, and fast food outlets present in their communities.

Absence of walkable neighborhoods. Given the significant agreement in the health sciences literature that disparities between communities are reflected in poor health outcomes (i.e., obesity, cardiovascular disease, type 2 diabetes) and inadequate access to resources (i.e., quality food outlets and supportive environmental structures), it seems clear that interventions should address barriers to access created by the built environment. Type 2 diabetes educators generally encourage individuals who are diagnosed with type 2 diabetes to become more physically active. However, directives to increase physical activity assume that individuals have access to safe outlets for physical activity or live in walkable neighborhoods. According to Sallis et al. (2009), "[d]esigning neighborhoods to support physical activity can now be defined as an international public health issue" (p. 488). A study examining the environmental factors and the physical activity of adults in Belgium, Brazil, Canada, Colombia, Hong Kong, Japan, Lithuania, New Zealand, Norway, Sweden, and the United States (Sallis et al., 2009) indicated that the prevalence of physical activity was significantly related to proximity to retail outlets, neighborhood transit stops, presence of sidewalks on most neighborhood streets, and bicycle and recreational facilities. Well-organized street networks, sidewalks, trails, bicycle paths, and proximity to recreational facilities and parks with attractive aesthetics are characteristics of physical spaces that encourage physical activity (Heath et al., 2006; Sallis et al., 2006; Sallis & Glanz, 2009). Conversely, the deficits in the built

environment can be a significant barrier to participation in regular physical activity and promote the associated health burdens (i.e., obesity and type 2 diabetes; Casey et al., 2008).

In a later study, Kerr et al. (2010) tested the hypothesis that participants of diabetes education groups would increase their walking more if they were residents of more walkable neighborhoods. The study results indicated that group intervention participants from more walkable neighborhoods had greater baseline walking levels than those from less walkable neighborhoods. The walking behavior of participants from walkable neighborhoods did not increase as a result of the group intervention. However, participants from less walkable neighborhoods who learned to overcome environmental barriers walked more as a result of the group intervention.

Food insecurity. The problems of access posed by the built environment frequently intersect with poverty. While the research on food deserts tends to focus on the challenges of urban communities with a high ethnic minority presence, food inaccessibility is also a significant problem in rural, ethnically diverse, and predominantly White communities. *Food insecurity* refers to the limited access or uncertainty regarding food availability that is necessary to engage in a healthy life (Holben & Pheley, 2006). Food insecurity is relevant to the development of type 2 diabetes because individuals who are *food insecure* have been found to be more likely to be overweight and obese (Crawford et al., 2004; Olson, Bove, & Miller 2007; Townsend, Peerson, Love, Achterberg, & Murphy, 2001). Initially, the association between excess energy stores (i.e., obesity) and limited food availability may appear counterintuitive.

However, a closer examination of the behaviors of individuals with limited or uncertain access to food indicates that they are more likely to purchase less expensive, energy dense foods (i.e., high calorie), or overeat when food is available. Both of these behaviors would encourage obesity and interfere with successful type 2 diabetes self-management.

Holben and Pheley (2006) examined the chronic disease development and management consequences of individuals experiencing food insecurity. The researchers compared food secure households and food insecure households among predominately White adults from the rural, northern Appalachian region of Ohio. Participants from food insecure households reported significantly higher rates of obesity (48.1% compared to 35.1%) and diabetes diagnoses (37.9% compared to 25.8%) than those from food secure households. Further, those from food insecure households reported higher rates of poorer diabetes management as indicated by Hba1c score (an indicator of long-term successful blood glucose management). Individuals with an Hba1c score greater than 7% (indicating poor long-term hemoglobin glucose levels) were more likely to come from a food insecure household than respondents with an Hba1c score less than 7% (33.9% compared to 22.5%).

Social-cultural context. As stated in the previous section, Native American communities have the highest reported incidence of type 2 diabetes of any ethnic group (Lemley, 2008; Pavkov et al., 2008; Valencia et al., 2005). The physical activity behaviors of Native Americans have been found to be a significant factor in the increased rates of diagnosis in this population (Harnack, Sherwood, & Story, 1999; Stolarczyk et

al., 1999; Thompson et al., 2002). Thompson, Wolfe, Wilson, Pardilla, and Perez (2003) conducted a quantitative study designed to determine the most prominent factors associated with the physical activity of Native American women living in the Southwest. The authors found that insufficient time and low exercise self-efficacy, self-motivation, and energy were significant barriers to meeting physical activity recommendations. The authors also found that social environmental factors, including support from family, friends, community and tribal leaders, and seeing others in the community engaging in physical activity were significant contributors to increased physical activity. The authors noted that the presence of community support allowed the participants to give themselves permission to engage in physical activity, lessening the burden of feeling that they had abandoned traditional gender roles and caretaker responsibilities.

Significant research has been conducted on the social factors contributing to the exercise behaviors of African American women (Harley, Odoms-Young, Beard, Katz, & Heaney, 2009; Sanderson et al., 2003; Wilbur, Chandler, Dancy, & Lee, 2003; Young & Voorhees, 2003). Fleury and Lee (2006) reviewed the literature on the social and contextual factors that influence the physical activity levels of African American women. The authors analyzed intrapersonal factors (defined as perceived functional ability, socioeconomic status, educational level, employment status and motivational variables), interpersonal factors (defined as culturally relevant social support and social norms), community factors (defined as health promoting resources), and organizational factors (defined as organizational partnerships or policy resources). Points of leverage for potential interventions targeted at encouraging African American female physical activity

were categorized as *intrapersonal*—encouraging of current physical skill levels, positive attitudes about exercise, commitment, and self-efficacy, *interpersonal*—encouraging social support with family and friend agreements to provide childcare and sharing of household responsibilities, *organizational*—encouraging of the inclusion of churches, community organizations, and workplace policies, and *community focused*—encouraging of the development of secure built environments. These categories underscore the importance of the social environment in physical activity behavior.

Other studies are consistent with the findings of Fleury and Lee (2006). Banks-Wallace (2000) conducted a qualitative study of the physical activity behaviors of African American women and found that inadequate childcare and exercise partners and role strain were significant barriers to physical activity. Young and Voorhees (2003) studied the physical activity behaviors of African American women and found that exercise partners and community groups were significant supporters of physical activity and insufficient childcare and multiple social roles were significant barriers to physical activity. Ainsworth, Wilcox, Thompson, Richter, and Henderson (2003) studied the correlates of physical activity in African American women in the South and found that exercise self-efficacy, low social role strain, the presence of sidewalks, and seeing other people exercise in the neighborhood were positively associated with meeting physical activity recommendations. Conversely, lack of time, lack of will power, and lack of energy were most the most frequently cited barriers. Sanderson et al. (2003) studied the correlates of physical activity in rural African American women and found that knowing

people who exercise, seeing people exercise in the neighborhood, and religious service attendance were associated with greater physical activity.

Researchers who have studied Latino Americans have found social barriers to physical exercise similar to those present in African American communities (Evenson, Sarmiento, Tawney, Macon, & Ammerman, 2003; Voorhees & Young, 2003; Wilbur, Chandler, Dancy, & Lee, 2003). In a study of 671 Latina immigrants from the Piedmont and Central regions of North Carolina, researchers found that 37.4% met physical activity recommendations, 41.9% reported insufficient physical activity, and 20.7% engaged in no moderate or vigorous physical activity. Women who were married or living with someone were slightly less likely (but not statistically significant) to meet exercise guidelines than women who did not have partners. The most cited reasons for low physical activity were insufficient time, motivation, and physical energy— findings that were consistent with studies of African American women. Traditional gender roles and household responsibilities tended to negatively influence physical activity. However, the women in this study did report that the presence of social support, knowing someone who exercised, or seeing people exercise in their neighborhoods was associated with increased physical activity.

Wilbur, Chandler, Dancy, and Lee (2003) reported consistent results in a study of 300 urban Midwestern Latinas. Sixty-four percent (64%) of the women were insufficiently active or inactive. Women who reported seeing people exercise in their communities were 2.5 times more likely to meet exercise recommendations, and women who participated in religious activities were twice as likely to meet exercise

recommendations. In a smaller study of 287 Latinas, Voorhees, and Young (2003) found that women with some college education were more likely to meet physical activity recommendations. Women who had higher levels of annual household income (greater or equal to $35,000), were employed, or were partnered were less likely to be physically active. Participants were also less likely to be active if they had children. These results are consistent with other findings related to Latinas, underscoring the point that the social environment can influence exercise behaviors positively or negatively depending on the presence of contextual factors such as traditional household roles, employment outside of the home, insufficient childcare, and role strain.

Although type 2 diabetes diagnoses are more prevalent in ethnic minority populations, the diagnosis does affect Whites, particularly those of lower socio-economic status and from rural communities (Brownson et al., 2000; Eyler & Vest, 2002; Melkus, Whittemore, & Mitchell, 2009). Eyler (2003) conducted a study designed to identify the personal, social, and environmental correlates of physical activity in 1000 rural Midwestern White women. In comparison to the high rates of physical inactivity found in ethnic minority populations, only 8% of this sample reported being physically inactive. Of this sample, younger women (20–30 years) were 1.63 times more likely to meet exercise recommendations than older women (40–50 years). Women with more than one child were less likely to be physically active. Women who belonged to community groups were more than 2 times as likely to participate in physical activity, and women who participated in religious activities were 1.63 times more likely to participate in physical activity than those who were not involved in religious activities. As was the

case in the studies of ethnic minority women reviewed here, the social environment was found to be a significant contributor to engagement in physical activity for White rural women.

In the previous section, the most prevalent demographic factors associated with type 2 diabetes diagnoses—age, gender, ethnicity, genetics, obesity, and socioeconomic status were discussed. Further, the environmental challenges associated with heightened type 2 diabetes risk, specifically the barriers posed by food deserts, food insecurity, the absence of walkable neighborhoods, and a social-cultural context that does not support regular physical activity were discussed. It is clear that a complex web of demographic and environmental factors contribute to food choice and physical activity behaviors. The physical and social environments present significant opportunities and barriers to developing sustainable, healthful self-management behaviors.

A review of the demographic and environmental contributors to type 2 diabetes diagnoses provides an epidemiological foundation and context for the current study. In light of these contributors, mindfulness and its related concepts of awareness and acceptance as dynamic processes may positively influence diabetes self-management and the work of type 2 diabetes practitioners. An understanding of the epidemiological factors that contribute to the prevalence of type 2 diabetes within the context of a mindfulness approach is potentially helpful in illustrating alternative type 2 diabetes self-management pathways and suggestions for improving intervention efforts. In the next section, a brief history of the mindfulness concept will be provided followed by discussions of mindfulness as a concept, process, and the mechanisms of change

associated with the practice of mindfulness. Additionally, mindfulness research in clinical populations will be reviewed, with special attention to research that has explored mindfulness concepts and related interventions in type 2 diabetes populations.

Mindfulness

Physician, teacher, researcher and developer of mindfulness-based stress reduction (MBSR) Jon Kabat-Zin popularized the mindfulness concept in several books, *Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness* (2009) and *Wherever You Go, There You Are: Mindfulness Meditation in Everyday Life* (1994). Kabat-Zinn defined mindfulness as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1994, p. 4). Since Kabat-Zin popularized the mindfulness in several books, comparable definitions have been developed that place varying emphasis on the attention, awareness, and acceptance components of the concept (Baer, 2003; Bishop, 2002; W. B. Brown & Ryan, 2003; Shapiro et al., 2006). Grossman and Van Dam (2011) proposed a detailed description of mindfulness as: (a) deliberate, open-hearted awareness of moment-to-moment perceptible experience, (b) a process held and sustained by such qualities as kindness, tolerance, patience, and courage, (c) a practice of nondiscursive, non-analytic investigation of ongoing experience, (d) an awareness markedly different from everyday modes of attention, and (e) in general, a necessity of systematic practice for its gradual refinement. The authors noted that although mindfulness is frequently discussed in terms of its separate components, the concept is most accurately understood in the "synergistic and mutually reinforcing" (p. 220) interrelationships of it overlapping components.

In this section a brief history of the mindfulness concept will be provided. Mindfulness will be discussed as both concept and process that can be manualized and formally developed through participation in mindfulness based programs or informally practiced in private settings. Mechanisms of change will be reviewed in order to provide explanations of how mindfulness interventions are believed to influence the change process. Recent studies utilizing mindfulness-based interventions in clinical populations (i.e., mood disorders, eating disorders, substance abuse, cancer, heart disease, chronic pain, and obesity) will be discussed. Finally, mindfulness applications in samples of adults with type 2 diabetes will be discussed.

A Brief History of Mindfulness

Kabat-Zinn is credited for bringing mindfulness to the attention of current clinicians and researchers. Although mindfulness is primarily attributed to eastern Buddhist philosophy, the language and application of mindfulness has connections to western Humanistic psychotherapy (Dryden & Still, 2006). The concept's nonjudgmental orientation toward experience is consistent with Carl Rogers' Person-centered therapy (Rogers, 1959). Mindfulness theory's *acceptance* mirrors the *unconditional positive regard* (a core condition of the Rogerian therapeutic relationship) that allows the client to freely explore thoughts and feelings without fear of criticism and opens the channel for resolving internal conflict. Further, the concept's emphasis on body awareness is reminiscent of the work of Perls, Hefferline, and Goodman (1972) whose Gestalt therapy made the client's awareness of the physical body in the *here and now* integral to raising unconscious blocks and resolving psychological distress.

Mindfulness's eastern roots can be found in the teachings of Siddhartha Gautama, who came to be known as the Buddha. It is believed that Siddhartha Gautama was born to wealthy nobility around the fifth Century B.C. Despite his social position and privileged upbringing, it was revealed to Siddhartha during meditation that he must adopt an ascetic life in order to find freedom from suffering. During the course of his travels, courses of study, and periods of deep meditation, Siddartha attained what he believed to be freedom from human suffering and came to be called the Buddha. During the Buddha's awakening experience, *the Four Noble Truths* were revealed, which include: (a) the universality of human suffering, (b) the cause of suffering through selfish desire, (c) the solution to suffering and, (d) the path to overcoming suffering. The way to overcoming suffering is called the *Noble Eightfold Path* and is composed of eight steps: (a) right views, (b) right intention (wisdom), (c) right speech, (d) right action, (e) right livelihood (ethics), (f) right effort, (g) right mindfulness, and (h) right concentration (mental discipline). According to the teachings of the Buddha, pain is an inevitable part of life in the forms of birth, old age, sickness, death, and separation from beloved material things. However, suffering can be avoided by resisting attachment to thoughts, feelings, and experiences that are temporal. Contentment is found in complete acceptance of the present-moment experience (Rockhill, 2007).

A modern interpretation of Buddhist philosophy and application of mindfulness principles suggest that enlightenment can be found by seeking satisfaction in the current life experience. Fulfillment is found by resisting the tendency to attach to beliefs about the past and expectations of the future, but rather choosing to live in a state of

appreciation for the fullness of the present. Buddhist philosophical principles and meditative practices are commonly cited as the foundations for modern understandings of the mindfulness concept (Hirst, 2003; Williams & Kabat-Zinn, 2011). The essential components of mindfulness—focused attention on the present-moment experience and the ability to openly accept all experiences—are expansive, having fostered considerable interest, multiple perspectives, and interpretations. The following section includes discussions of mindfulness as a concept and as formal and informal processes. Mechanisms of the change process are discussed followed by discussions of research on the use of mindfulness interventions and applications in various clinical populations. The section will end with a discussion of mindfulness research in the type 2 diabetes population.

Mindfulness as Concept

Given the number of researchers who have contributed to the multi-faceted idea of mindfulness, it is clear that mindfulness is "a deceptively simple concept that is difficult to characterize accurately" (W. B. Brown & Ryan, 2003). Arguably the most prominent scholar in the field of mindfulness and the use of mindfulness in medical settings, Jon Kabat-Zinn, has been critical of attempts to characterize mindfulness as another cognitive-behavioral technique that can be "plugged into a behaviorist paradigm" (Kabat-Zinn, 2003b, p. 145) in order to fix a thought or behavior that has been identified as dysfunctional. Even though participants may come to the practice of mindfulness with legitimate health concerns such as improving blood glucose levels, lowering blood pressure, or improving pain management, participants are encouraged to focus on

moment-to-moment awareness instead of attachment to a particular outcome. Mindfulness as a derivative of Buddhist philosophy encourages participants to accept their thoughts and emotions without judgment and to release specific expectations or goals for participation. Whereas the fundamental components of awareness and an attitude of acceptance towards events are included in most definitions, it is apparent that different writers emphasize different aspects of the concept. The differences in emphasis serve to underscore the point that mindfulness is a highly nuanced and multi-faceted concept that has been adapted to serve the intentions of the theorists and clinicians who have utilized it. This section is intended to provide some clarity about what is generally meant by the term *mindfulness* and provide a uniform, operational definition that will be referenced in the current study.

Mindfulness has been defined as a state where "one is highly aware and focused on the reality of the present moment, accepting and acknowledging it, without getting caught up in the thoughts or emotional reactions to it" (Bishop, 2002, p. 71). Baer (2003) defined mindfulness as ". . . the nonjudgmental observation of the ongoing stream of internal and external stimuli as they arise" (p. 125). W. B. Brown and Ryan (2003) defined the concept as "a receptive attention to and awareness of present events and experience" (p. 822). According to Shapiro et al. (2006) mindfulness occurs during a convergence of (a) acting with *intention* or purpose, (b) paying *attention* to the moment-to-moment experience, and (c) demonstrating an attitude of *acceptance* that is simultaneously compassionate, open, and non-striving. Recognizing the multi-dimensional nature of mindfulness, Baer et al. (2008) discussed mindfulness in terms of

five facets: (a) the ability to *observe* internal and external experiences, (b) the ability to *describe* observed experiences with words, (c) the ability to *respond* with awareness to one's surroundings, as opposed to reacting mechanically, (d) the ability to maintain an attitude of *non-judgment* towards one's thoughts and feelings, and (e) the ability to exhibit *non-reactivity*, or the ability to observe thoughts and feelings as they come and go without developing an attachment to them. Consistent through each of these definitions are the individual's conscious awareness of the present moment experience and an orientation of acceptance toward experiences.

W. B. Brown, Ryan, and Creswell (2007) summarized the central characteristics of mindfulness found in Buddhist texts. The first characteristic, *clarity of awareness*, refers to the mind's capacity to objectively observe all experiences. The second characteristic, *nondiscriminatory awareness*, refers to the ability to notice emotional and cognitive events without attempting to interpret or interfere with the experience. Consequently, thoughts and their reactions are less likely to become attached to problematic belief systems. Mindfulness allows *flexibility of awareness*, whereby the mind's attention can move between experiences with the ability to change perspective from narrow to broad as needed and an *empirical stance toward reality*, whereby observations are based in fact, not interpretation. W. B. Brown et al. (2007) elaborated that this empirical stance toward reality does not imply a disinterested stance toward experiences. On the contrary, a mindful state is actively engaged in thoughts and emotions and deeply connected to personal experiences and the experiences of others. Further, mindfulness confers a *present-oriented consciousness*—an understanding that

the human experience exists in the present, as opposed to the past and future. Although the individual's attention may move to direct focus on the recollection of a thought or emotion, the ability to return to the present moment is always available. Finally, mindfulness is *stable* and *continuous*; the ability to be mindful is inherent to the human experience, and the ability to access a mindful state is always accessible (W. B. Brown et al., 2007).

Given the diverse definitions of mindfulness in the literature, an expert panel was convened to establish consensus on an operational definition of mindfulness in order to facilitate mindfulness research and measurement (Bishop et al., 2004). The following definition of mindfulness emerged:

> the self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment . . . [while] adopting a particular orientation towards one's experience in the present moment, an orientation that is characterized by curiosity, openness, and acceptance. (Bishop et al., 2004, p. 232)

This definition includes the following components: (a) ability to regulate attention, (b) awareness of the present experience, and (d) an attitude of acceptance or nonjudgment toward the experience. The operational definition of mindfulness developed by Bishop et al. (2004) has been widely cited by researchers and developers of instruments used to measure mindfulness and its components and is the primary definition used in the current study.

Mindfulness as Formal and Informal Process

According to W. B. Brown et al. (2007), it is important to remember that "mindfulness is a quality of consciousness manifest in, but not isomorphic with, the activities through which this quality is enhanced" (p. 215). In other words, mindfulness is both a state of being *and* practice intended to strengthen the skills necessary to achieve a mindful experience. Dimidjian and Linehan (2003) defined the practice of mindfulness as: "(1) observing, noticing, bringing awareness, (2) describing, labeling, noting, and (3) participating" with a perspective that occurs "(1) nonjudgmentally, with acceptance, allowing, (2) in the present moment, with beginner's mind, and (3) effectively" (p. 166). Shapiro and Carlson (2009) stated that mindfulness involves an outcome (i.e., mindful awareness) and a process (i.e., mindful practice). The authors defined *mindful awareness* as "an abiding presence of awareness, a deep knowing that manifests as freedom of mind (e.g., freedom from reflexive conditioning and delusion)" and *mindful practice* as "the systematic practice of intentionally attending in an open, caring, and discerning way, which involves both knowing and shaping the mind" (Shapiro & Carlson, 2009, p. 559). Mindfulness is the central component of several approaches including Dialectical Behavior Therapy (DBT; Linehan, 1993), Mindfulness-Based Cognitive Therapy (MBCT; Teasdale, Segal, & Williams, 2000), and Acceptance and Commitment Therapy (ACT; Hayes et al., 1999). Likewise, meditation, Yoga, Tai Chi Chuan, and Qigong are a few of the most cited practices that encourage skills associated with mindfulness (i.e., attention, present-focused awareness, and acceptance). In the next section a few of the

most cited formal and informal approaches and practices that are used to cultivate mindfulness are reviewed.

Formal processes. Jon Kabat-Zinn developed Mindfulness-Based Stress Reduction (MBSR) in 1979 at the University of Massachusetts Medical Center as a complement to conventional medical care used to treat persons with chronic illnesses (Kabat-Zinn, 1982). MBSR has been used as a psychological intervention and complementary therapy in numerous medical settings to reduce the stress and suffering associated with chronic diseases such as cancer, heart disease, fibromyalgia, and depression (Shigaki, Glass, & Schopp, 2006; Praissman, 2008; Teasdale et al., 2000). Traditional MBSR is facilitated by certified MBSR instructors and conducted in an 8-week module. Each weekly session lasts from 1 ½ to 2 ½ hours and includes an experiential meditation (i.e., body scanning, sitting meditation, walking meditation, or Yoga) followed by a processing and educational component.

Another mindfulness-based intervention, Acceptance and Commitment Therapy (ACT), is focused on the acceptance facet of mindfulness; thoughts and emotions are not judged as correct or incorrect, but as valued experiences (Hayes et al., 1999). ACT has been used successfully in clinical populations to improve diabetes self-management, obesity related quality of life, smoking cessation, chronic pain, and breast cancer related distress (Branstetter, Wilson, Hilderbrandt, & Mutch, 2004; Dahl, Wilson, & Nilsson, 2004; Forman, Butryn, Hoffman, & Herbert, 2009; Gifford et al., 2004; Gregg et al., 2007; Lillis, Hayes, Bunting, & Masuda, 2009). ACT is premised as a counter to experiential avoidance, or the tendency to escape or resist uncomfortable emotions,

cognitions, or bodily sensations. Although experiential avoidance can involve a functional set of behaviors that allows for coping in the short-term, the long-term dependence on avoidant behaviors can reinforce an inflexible orientation toward present moment occurrences. The purpose of ACT is to encourage the type of emotional and cognitive flexibility that will facilitate contact with the present-moment experience with full awareness (Ruiz, 2010).

ACT is organized into two phases (Hayes et al., 1999). The first phase involves the development of *creative helplessness*, values clarification, and development of the willingness to experience feared events. Patients are encouraged to distinguish between the short and long-term effects of their avoidance behaviors and examine the futility of past attempts to control or avoid their experiences. Patients are encouraged to prioritize their values in order to develop the motivation to experience the feared emotional and cognitive events. Willingness to experience the feared event is presented as movement toward the values that have been identified. The second phase of ACT involves the development of *cognitive diffusion*. Cognitive diffusion is a process of treating thoughts as external, observable events that allows potentially disturbing thought experiences to occur without a negative emotional or behavioral consequence. Events are observed as they are, comfortable or uncomfortable; therefore, the goal is not to remove any associated discomfort, but to encourage behaviors that are consistent with the stated values in the face of the discomfort. For example, an individual with diabetes may find making regular glucose testing uncomfortable and anxiety provoking. The thoughts *"It will hurt"* or *"My numbers will be bad"* are treated as events that are separate from the

self; cognitions are noticed for what they are, just thoughts that are not determinative of the subsequent emotional or behavioral response. Therefore, consistent with the identified values of maintaining good health, the individual can choose to test her blood sugar.

Although the authors of Dialectical Behavior Therapy (DBT) and Mindfulness-Based Cognitive Therapy (MBCT) do not consider these therapies per se "mindfulness" interventions, the therapies do incorporate mindfulness-based concepts and skills in a group format. DBT has been used successfully with patients diagnosed with borderline personality disorder and eating disorders (Linehan, 1993; Robins & Chapman, 2004). Similarly, MBCT is most commonly associated with the treatment of depression (Segal, Williams, & Teasdale, 2002). MBCT discourages the challenging and changing of the content of thoughts and beliefs, and encourages participants to focus on thoughts and feelings while cultivating a perspective of detachment that results in the de-escalation of thoughts related to depression.

Informal processes. Meditation or *mindfulness meditation* is considered the foundation of traditional mindfulness-based practices. There are many styles of meditation. The most traditional and disciplined form of meditation, Vipassana, comes from the Buddhist tradition and focuses on quiet contemplation and introspection, focus on the breath and other physical processes, and the development of insight. Various other types of meditations are commonly practiced, including guided meditations that encourage participants to imagine themselves on a mountain or on the shore of an ocean, themed meditations that encourage participants to engage thoughts of loving kindness,

gratitude, or forgiveness, walking or active meditations that encourage participants to bring awareness to the sensations in their bodies, and sitting meditations that encourage participants to bring their nonjudgmental attention to inhalations and exhalations of the breath. Numerous studies have explored the psychological benefits of the stress reduction, attention focusing, and emotion regulation qualities of meditation (Ando et al., 2009; Lykins & Baer, 2009; Nielson & Kaszniak 2006; Schoormans & Nyklicek, 2011).

Baer et al. (2008) gathered data from 213 experienced meditators regarding length of meditation experience and general well-being. The results indicated that longer meditation experience was significantly associated to mindfulness and well-being. Lykins and Baer (2009) also conducted a study comparing regular, long-term meditators (on average 7.6 years of experience meditating) and demographically similar non-meditators with the purpose of determining the relationships between meditation experience and emotional intelligence, openness to experience, rumination, and thought suppression. The meditators were asked to exclude practices such as Yoga, Tai Chi Chuan, Qigong, and prayer from the descriptions of their meditation experiences. All participants completed several measures related to mindfulness and emotional reactivity including: the Five Facet Mindfulness Questionnaire (FFMQ) (a measure of the observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience), the Depression Anxiety Stress Scales (a measure of negative affect and bodily symptoms), the Cognitive Failures Questionnaire (a measure of absentmindedness), the Rumination-Reflection Questionnaire (a measure of tendency to ruminate and reflect), and The Affective Control Scale (a measure of fear of losing

control over emotions). The results indicated that the meditators scored significantly higher on the observing, describing, nonjudging, and nonreactivity facets of mindfulness. Further, as hypothesized non-meditators were found to have significantly higher scores for cognitive failures, rumination and reflection, thought suppression, and difficulty in emotional regulation.

The clinical benefits of Yoga (Kuttner et al., 2006; Sareen, Kumari, Gajebasia, & Gajebasia, 2007; Sherman, Cherkin, Erro, Miglioretti, & Deyo, 2005) and the relationship of the practice to mindfulness have been documented (Salmon, Lush, Jablonski, & Sephton, 2009). Yoga sequences are included in Mindfulness-Based Stress Reduction programs in order to encourage mindful awareness of body movement and sensations. Kabat-Zinn (2003a) attests "[m]indful Yoga is a specific attitude and attentional practice stance that we bring to our practice, both on the mat and in daily life: namely a refined, moment-to-moment non-judgmental, non-striving attending to the entire range of our experience" (p. 89). Yoga is described as a lifestyle and practice of interconnecting the physical, mental, and spiritual forces of the body. The practice generally involves a series of physical postures designed to encourage physical flexibility, mental focus, attention to the present moment, and acceptance of the self. Numerous studies have been conducted on the benefits of Yoga in the type 2 diabetes population (Innes et al., 2008; Jain, Uppal, Bhatnagar, & Tulukdar, 1993; Kosuri & Sridar, 2009; Malhotra, Singh, Tandon, & Sharma, 2005; Skoro-Kondza, Tai, Gadelrab, Drincevic, Greenhalgh, 2009; Yang et al., 2011). Specifically, Yoga has been reported to significantly reduce Hba1c, cholesterol, body weight, and the need for diabetes

medication. It is believed that Yoga encourages diabetes related benefits by reducing sympathetic nervous system activity which reduces the inflammatory response caused by stress and activating the parasympathetic nervous system which elevates mood state and diminishes the negative neuroendocrine inflammatory response (Alexander et al., 2010).

Similar to Yoga, Tai Chi Chuan is an eastern mind-body practice that has been used for centuries to enhance physical and psychological well-being (Wang, Bannuru, et al., 2010). Tai Chi Chuan has been described as both martial art and "physical culture/healing practice" (Gilman, 2008, p. 30). The practice is based in the belief that strengthening the physical, mental, and spiritual parts of the self are essential to finding harmony and balance in the midst of the extreme forces (i.e., yang versus yin) that occur during the course of life. Several studies have reported the clinical benefits of Tai Chi Chuan in chronic disease populations (Mills, Allen, & Carey-Morgan, 2000; Sandlund & Norlander, 2000; Sprod et al., 2012; Wang, Schmid, et al., 2010). Tai Chi Chuan has also been used successfully to increase mobility and reduce pain in patients with type 2 diabetes (Orr, Tsang, Lam, Comino, & Singh, 2006; Tsang, Orr, Lam, Comino, & Singh, 2007; Tsang, Orr, Lam, Comino, & Singh, 2008). The mental clarity and attention required in the series of intentional, slow, and precise physical movements encourage a calm, present-focused, centered, and meditative state. Tai Chi Chuan is considered a type of mindfulness practice because the sequenced movements require a harnessing of the mind in order to bring present-focused awareness to the body.

Mechanisms of Change

As definitions of mindfulness have developed so has interest in the use of mindfulness interventions for various physical and psychological conditions. The use of mindfulness interventions has raised the need to understand *how* mindfulness contributes to the change process. In order to continue mindfulness research and propose new applications for interventions, the mechanisms for change must be fully understood. In the following section, the physiological processes that influence the positive outcomes associated with mindfulness are discussed.

Emotion regulation, one of the reported benefits of a mindfulness practice, has been described as the internal "processes that serve to intensify, dampen, or maintain the behavioral, cognitive, experiential, or physiological aspects of emotion depending on an individual's goals" (Mitmansgruber, Beck, Höfer, & Schüßler, 2009, p. 448). It is important to recognize that the regulation of emotion—in the context of mindfulness—does not involve the practice of discouraging the acceptance of emotion or intervening in order to change the occurrence of negative emotions (Hamilton et al., 2004; Herwig, Kaffenberger, Jäncke, & Brühl, 2010). Instead, emotion regulation in this context is better understood as encouraging the individual to accept the presence of the disturbing emotion without over engagement in order to remain the observer of the entire emotional experience (Kumar, Feldman, & Hayes, 2008; Williams, 2008). Several studies have demonstrated that people who are more mindful have greater ability to regulate their emotions because they have engaged the parts of the brain associated with attention, concentration, and emotion regulation (Creswell, Way, Eisenberger, & Lieberman, 2007;

Grant, Courtemanche, Duerden, Duncan, & Rainville, 2010; Greeson, 2009; Hölzel et al., 2007, 2008, 2009; Luders, Toga, Lepore, & Gaser, 2009; Way, Creswell, Eisenberger, & Lieberman, 2010). These studies suggest that mindfulness works by not only changing how emotions are approached, but also by improving brain functioning in the areas responsible for emotional processing.

Hölzel et al. (2011) conducted a study with the purpose of identifying changes in the gray matter of the brain with participation in an 8-week Mindfulness-Based Stress Reduction (MBSR) course. Eighteen adults who had not participated in meditation classes in the previous 6 months, no more than 4 classes in the previous 5 years, and no more than 10 classes in their lifetime were enrolled in MBSR and compared to a control sample of 17 adults. In addition to the weekly MBSR classes, the experimental group were given a 45 minute audio recording of mindfulness exercises and encouraged to develop a daily home practice by integrating mindfulness into daily activities such as eating, walking, and bathing. MBSR participants reported spending approximately 27 minutes a day on mindfulness-based activities. All participants were given the Five Facet Mindfulness Questionnaire (FFMQ) and MRIs pre and post participation in the intervention. A comparison of pre and post test scores of both groups indicted that the MBSR group demonstrated significant increases in the acting with awareness, observing, and nonjudging scales of the FFMQ that were not present in the control group. Further, MRI comparisons of both groups indicated that the MBSR group demonstrated significant increases in gray matter in the posterior cingulated cortex, temporo-parietal junction, and cerebellum areas of the brain. These findings are significant because they

provide empirical support for the hypotheses that trait mindfulness (i.e., observing, acting with awareness, nonjudgement) and the areas of the brain responsible for emotion regulation and stress response are positively associated with an intentional mindfulness practice.

Rumination, an intense preoccupation with recurrent thoughts focused on past and future experiences, is a significant factor in anxiety and depressive disorders (Cheung, Gilbert, & Irons, 2004; B, J. Cox, Enns, & Taylor, 2001; Papageorgiou & Wells, 2003). It is theorized that rumination encourages negative emotional states because the thoughts are often accompanied by a focus on faults and an unrealistic desire to influence past and future events. Patterns of rumination contribute to a spiraling of dysphoric affect that can contribute to depression. It has been postulated that a consistent mindfulness practice and the development of a mindful state counters rumination by refocusing the individual on the moment-to-moment awareness of thoughts and encouraging an accepting stance toward experiences and events. A mindful orientation toward experiences allows users to notice their thoughts without becoming caught up in obsessive cycles and over-identification with their thoughts.

It appears that another way that mindfulness interventions affect mood is through the reduction of cognitive distortions. Sears and Kraus (2009) conducted a study to explore whether a mindfulness meditation intervention would influence cognitive distortions and coping styles. In a pre–post intervention design, the researchers compared a control group, a brief weekly meditation group focused on developing friendliness, joy, peacefulness, and compassion for self and others (i.e., loving - kindness meditation), a

brief weekly meditation group focused on developing nonjudgmental awareness of the breath, sounds, and bodily sensations (i.e., mindful attention), and a longer weekly meditation that included a combination of loving kindness and attention meditation. Participants were assessed for anxiety (Beck Anxiety Inventory; Beck, Epstein, Brown, & Steer, 1988), positive and negative affect (Positive and Negative Affect Scale; Watson, Clark, & Tellegen, 1988), irrational beliefs (Irrational Beliefs Scale; Malouff & Schutte, 1986), coping style (Brief Cope; Carver, 1997), and hope (Hope Scale; Snyder et al., 1991). The results indicated that changes in cognitive distortions mediated the intervention effects on anxiety, negative affect, and hope. The mediation model demonstrated that reductions in cognitive distortions following the meditation sessions resulted in significant decreases in anxiety and negative affect and significant increases in hope. Further, the results suggested that the longer meditation sessions reduced negative affect and anxiety and improved hope, and the shorter sessions showed some evidence of mitigating normal increases in anxiety and negative affect. Given the negative emotional states that many people with type 2 diabetes experience, mindfulness practice may serve to lessen these experiences, leading to greater diabetes self-management.

A consistent mindfulness practice can develop the ability to identify and distinguish between emotions. According to Bishop et al. (2004), "the development of mindfulness would likely result in greater capacity to distinguish feelings from bodily sensations unrelated to emotional arousal and to understand and describe the complex nature of emotional states" (p. 234). In this way, mindfulness encourages emotional and sensory clarity. Heightened emotional awareness can have the undesired consequence of

allowing the individual to become consumed by emotional experiences. This type of over-engagement in emotional experiences can result in excessive worry, obsessions, and compulsive behavior. There is evidence that over-engagement in positive emotions can result in manic behaviors. However, under-engagement in emotional experiences is also problematic, as a pattern of under-engagement can lead to the avoidance of negative emotions, repression, self-harm, substance abuse, dissociation, and suicide (Johnson, 2003, as cited in Hayes & Feldman, 2004). The desired relationship toward emotions is one that is neither under or over engaged.

This balanced state of cognitive and emotional engagement is referred to in the mindfulness literature as *equanimity*. Equanimity is the ability to fully experience emotional events while maintaining balance and serenity (Astin & Keen, 2006; Kraus & Sears, 2009). According to Buddhist monk and scholar Thich Nhat Hanh (1999), equanimity might be thought of as the ability "[to] climb the mountain to be able to look over the whole situation, not bound by one side or the other" (p. 161). In the case of the individual managing type 2 diabetes, the presence of emotional equanimity has the potential to encourage the ability to fully experience stressful events without anger or disinterest, but with calm consideration and composure. The ability to regulate emotion in this manner has the potential of helping those with type 2 diabetes mitigate diabetes related emotional distress, a topic discussed in the next section, and engage in self-regulation—the conscious choosing of behaviors that are consistent with a healthy lifestyle.

A consistent theme in discussions of mindfulness and reflected in mindfulness-based approaches is the importance of developing an accepting, nonjudgmental awareness of distressing thoughts and emotions (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Linehan, 1993). It has been theorized that an attitude of acceptance results in the user developing the ability to notice cognitive and emotional experiences openly and flexibly without feeling compelled to change the experience. Instead of changing or avoiding the disturbing thought, mindfulness interventions encourage the participant to observe and fully expose one's self to the thoughts or emotions. Most mindfulness approaches and interventions encourage participants to simply take notice of their thoughts and feelings as they arise with an attitude of nonjudgment. At a fundamental level, mindfulness assists emotion regulation by changing the relationship that individuals have toward their thoughts and emotions. The participant transforms the relationship with thoughts and emotions from adversarial to the gentle, objective observer. This relational shift in perspective has been termed *reperceiving* (Shapiro et al., 2006). Reperceiving is distinguishable from the restructuring concept of cognitive-behavioral based treatment approaches that encourages the participant to change the thought or emotion. In contrast, reperceiving encourages the participant to change her relationship toward the thought such that the thought becomes nonthreatening and does not trigger reactive thoughts or emotions. In this way, reperceiving allows the participant greater opportunity for self-regulation of emotion, greater emotional flexibility, and an opportunity to experience a spectrum of emotions without fear and anxiety.

Shapiro et al. (2006) proposed the *reperceiving* model to explain a change mechanism of mindfulness that incorporates acting with intention, attention, and acceptance. Reperceiving encourages a shift in perspective that allows the individual to become the observer of painful and pleasurable emotions by developing a *decentered* and *detached* orientation toward experiences, in which thoughts and emotions become transient events that do not require emotional entanglement or attachment to the extremes of the experience. It is important to clarify that detachment from experience is distinguished from apathy, the inability to experience emotion or limited emotional vocabulary (i.e., alexithymia), or dissociation. On the contrary, the ability to reperceive and detach encourages the participant to become fully aware of the richness of each new experience. The ability to detach allows the individual to encounter each new experience with openness and curiosity. The authors further delineate four characteristics of the change process: (a) self-regulation and self-management (i.e., the ability to attend to new information and make behavioral shifts accordingly as opposed to succumbing to reactive patterns of behavior), (b) values clarification (i.e., the ability to prioritize values congruent with actual need and reflecting an authentic understanding of self), (c) cognitive and behavioral flexibility (i.e., the ability to be responsive instead of reactive to current experiences), and (d) exposure (i.e., the ability to experience distressing thoughts and emotions without reactivity).

Carmody, Baer, Lykins, and Olendzki (2009) conducted a study to test the reperceiving model proposed by Shapiro et al. (2006). The authors hypothesized that changes in mindfulness would predict changes related to reperceiving, self-regulation,

values clarification, cognitive and behavioral flexibility, and exposure. The authors also hypothesized that changes in cognitive behaviors would be mediated by the model's reperceiving and decentering mechanisms. Participants completed a seven week mindfulness based stress reduction (MBSR) program and a survey packet including the Five-Facet Mindfulness Questionnaire, measuring mindfulness (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), the Experiences Questionnaire, measuring a fundamental shift in perspective (Fresco et al., 2007), the Self-Regulation Scale, measuring self-management and self-regulation (Diehl, Semegon, & Schwarzer, 2006), the Purpose of Life Scale from the Scales of Psychological Well-Being, measuring values clarification (Ryff, 1989), the Environmental Mastery Scale from the Scales of Psychological Well-Being, measuring cognitive, emotional, and behavioral flexibility (Ryff, 1989), a subset of the Acceptance and Action Questionnaire, measuring exposure (Bond et al., 2008), and the Brief Symptom Inventory, measuring symptoms and perceived stress (Derogatis, 1992). As hypothesized, significant improvements in mindfulness and reperceiving were measured and levels of symptoms and stress were reduced post-MBSR intervention. Self-regulation, cognitive, behavioral, and emotional flexibility, values clarification, and exposure scores increased. Improvements in reperceiving were not found to be a significant mediator for mindfulness. The authors attributed this finding to the similarities between the mindfulness and reperceiving constructs.

Buddhist philosophy—the origin of many mindfulness practices—discourages attachment to past and future experiences. Integrating the elements of Buddhist philosophy, Grabovac, Lau, and Willett (2011) developed the Buddhist Psychological

Model (BPM). BPM illustrates that the mind is capable of focusing on one object at a time and that there is no distinction between the mind's awareness of events (i.e., thoughts, emotions, physical sensations, memories, etc.). Each experience of awareness brings forth an immediate, spontaneous affective experience or *feeling tone* that the mind instantly recognizes as pleasant, unpleasant, or neutral. Because feeling tones are immediate and fleeting as new experiences enter consciousness, they are frequently overlooked and subsequently contribute to reactive behaviors. According to Buddhist philosophy, habitual reactions to pleasant feeling tones create *attachment* and reactions to unpleasant feeling tones create *aversion*. Attachment and aversion are the basis for suffering.

Grabovac et al. (2011) also recognized the integral role of *acceptance* as an attitude of nonjudgment and compassion that discourages avoidance of nonpleasant feeling reactions to events. For example, the individual with diabetes may have a strong, unpleasant feeling tone toward pricking her finger in order to monitor her blood sugar. The negative feeling tone leads to an *aversion*. An example of an aversion in the type 2 diabetes context is an individual habitually reacting by failing to test blood sugar and as a consequence losing the ability to effectively self manage with recommended medication and food choices. The result is suffering, a health crisis set in motion by a series of habitual behaviors (i.e., failure to regularly monitor blood sugar, avoiding doctor's appointments, denial of exercise and nutrition recommendations). The model illustrates how the process of bringing nonjudgmental acceptance and awareness— key constructs

in this current study— to thought, emotion, and behavior patterns holds the potential for behavior change.

Mindfulness Applications in Medical Populations

Since the early 1990s there has been significant interest in mindfulness research in clinical populations. Numerous studies have applied the mindfulness concept to chronic illnesses with the purposes of reducing discomfort, improving the quality of life, and enhancing the ability to effectively manage symptoms (Ando et al., 2009; Kabat-Zinn, Lipworth, & Burney, 1985; Rosenzweig et al., 2007; Teasdale, Segal, & Williams, 1995).

Mindfulness-based interventions have been found to be effective in even the most serious cases of depression (Hoffman, Sawyer, Witt, & Oh, 2010; Segal et al., 2002). Teasdale and colleagues (2000) conducted a randomized controlled study of the use of Mindfulness Based Cognitive Therapy (MBCT) as a preventative for relapse/recurrence of major depression. The study was based on the assumption that the development of a detached relationship with thoughts and emotions related to depression would create greater capacity to prevent the spiraling of negative thinking during vulnerable periods. In the study, one group continued their regular treatment, and the other group was taught to disengage from repetitive depression related thoughts. The results indicated that MBCT was effective at preventing depression relapse and recurrence in patients with a history of three or more episodes of depression.

Researchers at the Center for Integrative Medicine at Duke University conducted a randomized control trial of a personalized health plan (PHP) intervention in patients with cardiovascular risk. The PHP intervention included mindfulness meditation,

progressive muscle relaxation, Yoga, guided visualization, and stress management, as well as education on personal risk, behavioral goal setting, lifestyle changes, and personal coaching (Edelman et al., 2006). At the ten-month follow-up, the decrease in cardiovascular risk (as measured by the Framingham risk score, a validated measure of the risk of having non-fatal myocardial infarction or cardiac death over 10 years) between the PHP group and the control group was statistically significant (16% in the intervention group compared to 12% in the control group). Although it is not possible to determine which components of the PHP intervention accounted for the difference between groups or if the difference between groups was attributable to the cumulative affect of the interventions' components, this study provides support for the effectiveness of an approach that uses mind-body principles to support behavior change.

Other researchers have demonstrated significant benefits of mindfulness interventions in lowering cardiovascular disease risk. In one study (Tacón, McComb, Caldera, & Randolph, 2003), members of a Mindfulness Based Stress Reduction (MBSR) group improved in their abilities to express negative emotions and indicated a significant decrease in the use of impulsive/reactive coping styles compared to a control group, that demonstrated no change in emotion expression ability or coping style. In another study, researchers hypothesized that individuals who considered themselves more mindful would demonstrate a smaller increase in cardiovascular responsiveness to a stressful mental task than those who considered themselves less mindful (Skinner et al., 2008). The results of the study indicated that participants reporting higher degrees of

mindfulness also demonstrated less cardiovascular reactivity, a factor associated with cardiovascular morbidity and mortality.

Lillis et al. (2009) conducted a study of obese individuals based on clinical observations that obese people tend to struggle with inadequate coping styles such as avoidance, impulsivity, and the use of food in response to a variety of emotions. The researchers tested the hypothesis that teaching acceptance and mindfulness skills would be helpful to obese persons challenged by these negative avoidance patterns and inflexibility in their emotional, cognitive, and behavioral responses to distress (i.e., suppression of difficult feelings, all-or-nothing thinking, overgeneralizing, and eating as a coping mechanism). The researchers used Acceptance and Commitment Therapy (ACT) to teach participants to cope with distressing thoughts and emotions by noticing the thoughts and remaining flexible in their responses. Participants were randomly assigned to education only or ACT groups. The ACT group showed significant improvements in perceived weight related stigma, psychological distress tolerance, and perceived quality of life. The most important measure from the perspective of the traditional medical community is that ACT participants demonstrated significant reductions in body mass. It is especially significant that participants lost significant amounts of weight without an intentional focus on weight loss.

Mindfulness-based interventions have been used in the management of various other chronic disorders including chronic pain, cancer, and substance abuse. One of the first uses of Mindfulness-Based Stress Reduction (MBSR) in a medical setting was with sufferers of chronic pain (Kabat-Zinn et al., 1985). Patients whose pain conditions had

not improved with traditional medical care participated in a 10-week stress reduction program and were compared to a control group of patients receiving traditional medical treatments. Group participants reported significant improvements in pain reduction and ability to cope with pain. Similarly, research on the use of mindfulness techniques in cancer patients suggests that mindfulness interventions may be useful in helping to relieve the discomfort and support coping of cancer related distress. In a later study, Shennan et al. (2011) conducted a meta-analysis of 13 mindfulness studies in oncology settings. Although the analysis did not make conclusions regarding the effectiveness of the various programs, evidence of measurable and subjective benefits was found. The mindfulness interventions were reported to contribute to reductions in anxiety, stress, mood disturbance, and increases in quality of life of cancer patients.

An emerging trend in the field of substance abuse counseling is the use of Mindfulness-Based Relapse Prevention (MBRP). MBRP, based on Vipassana meditation, was developed specifically to increase awareness and acceptance as coping strategies in the treatment of substance abuse and addiction (Witkiewitz et al., 2005). A preliminary test of the intervention with inmates in a minimal security rehabilitation facility demonstrated significant improvements in the frequency and quantity of drinking as compared to the control group inmates at 3 months post intervention. In a subsequent study, Zgierska et al. (2009) conducted a systematic review of longitudinal, pre-post intervention studies that used mindfulness meditation in patients with substance use disorders. Although not generalizable due to inconsistencies in the procedures of the mindfulness interventions, the authors reported that most of the studies indicated positive

outcomes compared to baseline and the use of other types of therapies. Of interest was the finding that mindfulness-based therapies might be particularly beneficial for substance abuse patients with co-occurring mental health disorders.

Mindfulness Applications in Type 2 Diabetes

There is a growing body of literature indicating the positive influence of mindfulness and the more specific characteristics of mindfulness (i.e., awareness and acceptance) on the progression of type 2 diabetes indicators (i.e., Hba1c and stress hormones), the quality of life of those diagnosed, and the ability to effectively self-manage the disease (Gregg et al., 2007; Rungreangkulkij et al., 2011; Surwit, 2005). The daily experience of persons with type 2 diabetes is typically fraught with frustrations related to unstable blood sugar, frequent blood sugar monitoring, lifestyle changes, and mood changes. Given the discomfort associated with managing the disease, the experience of distressing thoughts and emotions is common. Attempting to resist the distressing thoughts and emotions may be unrealistic and have the undesired effect of triggering negative thoughts and emotions of self-judgment and shame; therefore, mindfulness applications are indicated due to their focus on present moment awareness and acceptance (Gregg et al., 2007). Due to the particular relevance of present-moment awareness and acceptance in the type 2 diabetes population, these mindfulness related concepts are discussed in greater detail in the next section.

Awareness. Recent studies have evaluated the usefulness of present moment awareness of internal and external stimuli on the lives of those with type 2 diabetes. Richard S. Surwit, Ph.D., psychologist and medical researcher, has authored over one

hundred studies on mind-body interventions and is considered the foremost expert on the connection between type 2 diabetes, metabolism, and stress (Surwit, 2005). Surwit et al. (2002) studied the effectiveness of body awareness tools such as progressive muscle relaxation, biofeedback, and diaphragmatic breathing on stress and glycemic levels. The authors found significant differences between control and experimental groups in Hba1c levels, anxiety (as measured by the Spielberger State-Trait Anxiety Inventory), perceived stress in daily life (as measured by the Perceived Stress Scale), adjustment and feelings of distress (as measured by the General Health Questionnaire), BMI, dietary intake, and activities in daily living (as measured by the Duke Activity Status Index) scores. The identification of a mechanism for controlling glucose levels by controlling the body's stress response with body awareness interventions presents compelling support for the use of mindfulness interventions. According to Surwit (2005), for some people, diet, exercise, and medication may not be enough to bring glucose levels within an acceptable range because it is the release of hormones that are triggered by the body's stress response that are responsible for the body's metabolism of glucose. In *The Mind-Body Diabetes Revolution: The Proven Way to Control Your Blood Sugar by Managing Stress, Depression, Anger and Other Emotions*, Surwit (2005) recommended a regimen of daily progressive muscle relaxation training, recognition and processing of toxic emotional states (cynicism, anger, and aggression), and cognitive behavioral therapy as an essential component of effective glucose regulation.

One such intervention that incorporates present focused awareness is Mindfulness-Based Stress Reduction (MBSR). MBSR is an 8-week manualized program

that integrates stress management skills and mindfulness-based practices (i.e., Yoga, body scan, meditation). MBSR participants are encouraged to remain in the moment and release any expectation for a specific health related result. The release of attachment to a health outcome is necessary to cultivate an attitude of acceptance through a moment-to-moment awareness of the immediate experience (Praissman, 2008; Whitebird et al., 2009). Although release of a specific health outcome is discouraged, participants are encouraged to set a general intention, or purpose for practice.

Mindfulness-Based Stress Reduction (MBSR) has been used to alleviate the suffering associated with type 2 diabetes. Rosenzweig et al. (2007) found that the stress response could elevate glucose production, glucose mobilization, and insulin resistance—all indicators of diabetes risk and severity. The authors observed how MBSR affected glycemic control in participants with type 2 diabetes. Fourteen people with type 2 diabetes between 30 and 75 years of age who indicated no change to their medication, diet or exercise habits, and no participation in meditation practice in the twelve weeks prior to the intervention participated in an 8-week MBSR program. Hba1c, blood pressure, and weight were recorded at baseline, 8-week, and 1-month follow-up. The results demonstrated statistically significant reductions in Hba1c levels at the end of intervention and at end of 1 month follow-up, and a statistically significant reduction of arterial pressure at the one-month follow-up. The authors noted that the change might have been the result of lowered cortisol, norepinephrine, beta endorphin, glucagon and growth hormone—hormones that are sensitive to stress reduction and have the effect of increasing blood glucose and insulin resistance.

Hartmann et al. (2012) also explored the effects of MBSR in patients with type 2 diabetes. The authors conducted a 5-year randomized control trial that explored the effects of MBSR on psychological distress, health status, mortality, and cardiovascular events in persons with type 2 diabetes with albuminuria (i.e., a diabetes related complication caused by excessive protein in the urine). The only significant difference found between the control and experimental groups at baseline was a history of myocardial infarction, and no differences were found immediately following the intervention. However, significant differences were found at the 1-year point between the control and experimental groups in levels of depression, health status, and diastolic blood pressure. Although the results of the Rosenzweig et al. (2007) and Hartmann et al. (2012) MBSR studies are insufficient to conclude that MBSR is a proven treatment for type 2 diabetes related complications, these studies provide some preliminary support for the role of MBSR— of which mindfulness is a significant component— in improving the stress management, emotion regulation, and general well-being of this population.

Recent studies have explored the role of self-awareness in the process of type 2 diabetes self-management (Hernandez, Antone, et al., 1999; Ingadottir & Halldorsdottir, 2008). In *The Hernandez Theory of Integration*, Hernandez (1991) explained the process of individuals integrating their diabetes-based decision making into the contexts of their daily lives. According to the *Hernandez Theory of Integration*, individuals living with diabetes demonstrate a 3-phase process of disease management. The first phase is indicated by the patient's diagnosis, gaining the knowledge of *having diabetes*, and experiencing the desire to have a normal life. This phase is often expressed by denial of

having the disease and minimizing diabetes related thoughts and behaviors. The second phase is referred to as the *turning point* during which diagnosed individuals begin to change their behaviors in light of their diagnosis. Individuals in the third phase, referred to as the *science of one*, are characterized by the development of individualized ways of living with diabetes that frequently diverge from their prescribed regimen. Individuals in the *science of one* phase attribute their success to learning to constantly tune in to their body cues and sensations, described as "tuning in." Individuals in the *science of one* utilize planned and automatic "body checks" that are designed by the individual and situation specific. The *science of one* stage also includes the phenomenon of "knowing", a process of understanding one's body, typical body responses, and the ability to respond when sugar levels are outside of optimal levels. Hernandez (1991) concluded that individual body cues indicating varying sugar levels may differ from the cues taught in more traditional diabetes education programs; therefore, teaching awareness of individual specific body cues should be encouraged. As a result of learning body cues and sensations through enhanced awareness, individuals in the *science of one* stage are better able to integrate their diabetes management behaviors into their lifestyles thereby enhancing the ability to create self-management plans that result in optimal blood glucose levels.

Hernandez, Antone, et al. (1999) applied the *Hernandez Theory of Integration* to adults with type 2 diabetes. The authors conducted a grounded theory study of six women and four men of First Nations origin, ages 32 to 75 years of age, and a length of diagnosis from 2 to 32 years. Participants reported experiences that demonstrated a

continuum of *having diabetes* (denial, minimizing, and normalizing behaviors), *the turning point* (recognition that the condition cannot be ignored), and *science of one* (the integration of self-management behaviors into lifestyle and development of a routine). Individuals who reached the *science of one* stage reported that "tuning in," "knowing" the body, and "learning to live" with diabetes were important aspects of their self-care regimens.

Using the *Hernandez Theory of Integration* as a conceptual framework, Hernandez, Hume, and Rodger (2008) conducted a self-awareness intervention study on adults with type 1 diabetes. The purpose of the study was to evaluate the role of hypoglycemia unawareness (HU) (i.e., a phenomenon that is characterized by the inability to perceive or discern the symptoms and body cues associated with hypoglycemia) and evaluate an intervention designed to enhance the awareness of HU in persons with type 1 diabetes. HU is of concern to persons with type 1 and type 2 diabetes because HU can result in severe hypoglycemic episodes that can result in loss of consciousness, seizures, hospitalization, and death. The researchers collected data on integration (measured by The Diabetes Questionnaire), diabetes quality of life (measured by the Diabetes Quality-of-Life scale), and metabolic control (measured by Hba1c levels). The education components included (a) an introduction to self-awareness which included discussions of body cues and situations that might trigger certain body cues, (b) an appreciation for daily, monthly, and seasonal body norms, (c) recognizing hypoglycemia body cues, (d) recognizing hyperglycemia body cues, (e) recognizing euglycemia (i.e., optimally blood glycemic levels) body cues, and (f) focus on

hypoglycemia strategies. Education sessions took place over the course of eight bi-weekly, 3-hour sessions and included a pre-test and 6-month, 12-month, and 18-month post-tests. The study was significant because it demonstrated that a self-awareness intervention designed for people with diabetes could be effective.

Acceptance. Present moment awareness and acceptance have overlapping and distinct qualities. It might be said that complete awareness of the present moment experience requires the ability to accept what *is* thereby releasing attachment to the joy or regret of the past and the anticipation of the future. Haase, Britt, Coward, Leidy, and Penn (1992) defined acceptance in the context of illness as "a present-oriented activity requiring energy and characterized by receptivity toward and satisfaction with someone or something, including past circumstance, present situations, others and, ultimately, the self" (p. 144). Acceptance counters fear and resistance thereby encouraging the resolution of internal conflict. The authors also discussed the inherent *energetic* quality of acceptance, an attribute that seems to motivate individuals through the release of the tension caused by resistance.

Several researchers have explored the relevance of acceptance to those living with type 2 diabetes. Richardson, Adner, and Nordström (2001) conducted a study to determine how persons with diabetes accept their diagnoses, whether the acceptance was associated with coping, and whether disease acceptance and coping ability were related to diabetes related complications and glycemic control. The results indicated that participants who demonstrated higher levels of diabetes-related acceptance also demonstrated greater coping ability. Similar findings were found by Zauszniewski et al.

(2002) who conducted a study to test the relationships between depressive symptoms, cognitions, acceptance, and *learned resourcefulness* in women with type 2 diabetes. Learned resourcefulness refers to the coping skills utilized to control the potentially disturbing effect of negative cognitions, emotions, and sensations on daily activities (Rosenbaum, 1990). The study was based on the hypotheses that those experiencing less severe symptoms of depression and diabetes would demonstrate greater resourcefulness, that more positive cognitions and greater diabetes acceptance would predict greater resourcefulness, and that positive cognitions and diabetes acceptance would mediate the effects of symptoms of depression and diabetes on resourcefulness. The results indicated that acceptance and positive cognitions were significantly correlated with learned resourcefulness. However, the results did not indicate that acceptance was a mediator of the effects of depressive symptoms on learned resourcefulness. The authors explained that acceptance may not have explained the relationship between depressive symptoms and resourcefulness because the length of participant diagnosis ranged from 1 month to 31 years, a wide variation and a significant potential confound. These studies provide further support for the role of acceptance in the development of healthy coping behaviors.

As previously discussed, Acceptance and Commitment Therapy (ACT) teaches participants to utilize an attitude of acceptance by experiencing their thoughts and feelings rather than attempting to alter, stop, or otherwise challenge the thoughts. Gregg et al. (2007) conducted a study to test the affect of an ACT intervention on the Hba1c levels of people with type 2 diabetes. Pre and post intervention Hba1c levels (an indicator of average blood glucose levels over a two-three month period) were measured,

and participants were randomly assigned to one of two groups— an education only group that included seven hours of instruction on the disease process, nutrition, value of physical activity, blood glucose monitoring, use of results, and diabetes complications or an ACT and education group that included four hours of diabetes related instruction and three hours of ACT training. The results of the education only group indicated improved self-management, but no improvements in diabetic control as measured by Hba1c. Patients in the ACT group reported significant improvement in diabetic control at the 3-month follow up as measured by Hba1c, significant improvement in self-management score as measured by the Summary of Diabetes Self-Care Activities (SDSCA; Toobert et al., 2000), and diabetes-related self-acceptance as measured by the Acceptance and Action Diabetes Questionnaire (AADQ; Hayes et al., 2004). The authors concluded that ACT may be helpful because it encourages participants to become aware of their thoughts and emotions as they arise and practice acceptance of these thoughts and feelings. In addition to encouraging an attitude of acceptance, ACT encourages participants to identify their personal values and then develop a behavioral plan in accordance with the stated values. This study offers promising support for the usefulness of acceptance-based interventions with patients with type 2 diabetes.

Teixeira (2010) conducted a study to explore the effects of an acceptance meditation on the quality of life of persons with type 2 diabetes related peripheral neuropathy. Peripheral neuropathy is a painful condition of the extremities that is caused by damage to the circulatory system. The author conducted an experimental design study of individuals who identified as having painful diabetic peripheral neuropathy. After

receiving meditation instruction and directions to use a guided meditation CD for four weeks, members of the experimental group reported small improvements in pain related quality of life. In a subsequent study, Rungreangkulkij et al. (2011) measured the effects of a group intervention utilizing Buddhist principles of acceptance and meditation. In a quasi-experimental design, the control group attended routine monthly appointments at a diabetes care clinic, and the experimental group attended 6-weekly Buddhist group therapy sessions. At the six-month follow-up all of the patients who attended the group therapy sessions had returned to a normal level of depressive symptoms compared to 65.6% of the control group patients who returned to a normal level. The results suggested that the use of acceptance based group interventions may hold promise as a complementary therapy for this population.

In the previous section a brief history of mindfulness, discussions of the mindfulness concept, how mindfulness might be engaged as formal and informal processes, and mechanisms of the change process were provided. The application of mindfulness in clinical populations was discussed with special emphasis on studies of mindfulness in persons with type 2 diabetes. In light of recent studies that indicate the relevance of awareness and acceptance to the self-management outcomes of persons with type 2 diabetes, special attention was given to understanding these essential components of mindfulness.

A focus on mindfulness in the context of type 2 diabetes is important because the literature indicates that mindfulness and its related concepts, awareness and acceptance, have the potential of supporting the arduous task of self-management. In the next section

type 2 diabetes and the co-occurrence of negative mood including, negative coping patterns, symptoms of mood disorders, clinical depression, and diabetes-related distress will be discussed. Special attention will be given to diabetes-related distress, a condition that is specific to the type 2 diabetes population and a potentially significant factor in the ability to effectively self-manage this chronic condition.

Type 2 Diabetes, Negative Coping, Mood, and Diabetes-related Distress

Numerous studies have documented the association between elevated blood glucose and insulin resistance (i.e., indicators of type 2 diabetes diagnosis), type 2 diabetes, and the co-occurrence of negative coping styles (Decoster, 2003; Georgiades et al., 2009; Penckofer et al., 2007; Shen, Countryman, Spiro, & Niauro, 2008; Surwit et al., 2002; Vitaliano, Scanlan, Krenz, & Fujimoto, 1996), symptoms of depression and anxiety (Adriaanse et al., 2008; Collins-McNeil et al., 2007; Kagee, 2008; Kawakami, Takatuka, Shimizu, & Ishibashi, 1999; Lustman & Clouse, 2005), mood disorders (Aikens et al., 2008; Anderson et al., 2001; Collins et al., 2009; de Groot et al., 1999; Eaton, 2002; Egede, Zheng, & Simpson, 2002; Engum et al., 2005; Kruse et al., 2003), and the diabetes specific condition diabetes-related distress (L. Fisher, Mullan, et. al., 2008; L. Fisher, Skaff, et al., 2008; L. Fisher et al., 2010; Gonzalez et al., 2011).

The epidemiology of depression and type 2 diabetes co-morbidity indicates a complex web of contributing factors making it unclear precisely why the relationship between depression and type 2 diabetes exists. Some have hypothesized that the lifestyle changes required for effective type 2 diabetes management may contribute to stress induced depression. The negative emotions of persons with type 2 diabetes are likely

fostered and compounded by the daily demands of diabetes self-management, the unpredictable rise and fall of glucose levels even when best efforts are made to follow strict medication, eating and physical activity plans, and the fears of debilitating physical complications. Concurrent susceptibility may also be caused by genetics, physical environment, and changes in nutrition, exercise, and stress levels. The relationship has also been attributed to micro and macro-vascular damage (Lustman & Clouse, 2002) and neuroendocrine imbalances that predispose the individual to both depression and anxiety disorders (Eaton, 2002).

The presence of negative mood states in persons with type 2 diabetes is significant because the mental health of this population is frequently misunderstood, under-diagnosed, and not adequately addressed by endocrinologists and primary health providers (Beverly et al., 2011). The study of the prevalence of negative mood states in the type 2 diabetes population is of particular importance because it has been demonstrated that the psychological health of persons with type 2 diabetes is positively associated with the ability to effectively self-manage the disease (Anderson et al., 2001; Ciechanowski, Katon, & Russo, 2000; Jacobson, de Groot, & Samson, 1997; Talbot & Nouwen, 2000). In this section a review of the studies that have demonstrated the relationship between type 2 diabetes and negative coping styles, the presence of negative mood, and mood disorders will be presented. The discussion of negative coping and mood problems will provide context for the discussion of diabetes-related distress (DRD), a non-psychiatric condition that is frequently masked by the symptoms that are commonly associated with mood disorders (i.e., sadness, loss of interest in usual

activities, lethargy), but is distinguished from major depressive disorder because of its association with the specific social, emotional, and health related challenges of living with diabetes. Studies that have documented the occurrence of DRD with particular attention given to the therapeutic recommendations for those experiencing the condition will be reviewed. Finally, DRD will be presented as an impediment to effective self-management, and thus as a factor that can impact the relationship between mindfulness and diabetes self-management.

Type 2 Diabetes, Negative Coping, and Mood

Personality trait and coping style differences have been attributed to type 2 diabetes susceptibility. Rhodewalt and Marcroft (1988) explored the relationship between the regulation of blood glucose and the *Type A Personality*, characterized by a tendency toward impatience, hostility, and pressure toward achievement in contrast to the *Type B Personality*, characterized by contemplative, relaxed, and noncompetitive behaviors. The authors theorized that arousal of the sympathetic nervous system caused by a reactive response to control perceived threats was the biobehavioral pathway that elicits difficulty controlling blood glucose levels. The authors further theorized that the threatening qualities of health care settings and imposed treatment plans would trigger a reactive emotional response in the Type A personality. In response to a perceived loss of control, it would be consistent with this personality type to find psychological comfort in treatment noncompliance. In order to test this theory the authors measured personality trait by the Jenkins Activity Survey, Form C (JAS; Jenkins, Zyzanski, & Rosenman,

1979) and Hba1c levels. As predicted, Type A personality types were found to have significantly higher Hba1c scores than Type B personality types.

Subsequent studies have explored the role of hostility in impaired glucose tolerance (Georgiades et al., 2009; Shen et al., 2008; Surwit et al., 2002; Vitaliano et al., 1996). Georgiades et al. (2009) conducted a study to determine the moderating effect of sex and race on the relationship between hostility and fasting glucose levels, insulin, and insulin resistance. The study was an extension of previous research that suggested that women and African Americans appeared especially susceptible to the negative effects of hostility and glucose metabolism as compared to men and Whites (Cooper & Waldstein, 2004; Surwit et al., 2002). Non-diabetic, African American and White men and women with normal fasting glucose levels were recruited for the study (n = 565). Hostility, characterized as an attitude of cynicism and mistrust, was assessed with the Cook Medley HOST Scale (Cook & Medley, 1954). After adjusting for BMI and age, the results indicated a statistically significant positive association between hostility and fasting glucose in African American women. These findings are significant because they indicate hostility as a significant emotional precursor to type 2 diabetes risk. The authors noted that hostility was also associated to cardiovascular risk, depression, and low socio-economic status—conditions that occur more frequently in the type 2 diabetes population.

Weijman et al. (2005) termed the *diabetes avoidant coping style* to describe coping patterns specific to individuals diagnosed with type 2 diabetes. Present in the diabetes avoidant coping style were some of the negative mood states (i.e., cynicism, anger, and denial) that are associated with elevated blood glucose levels. In a study of

the personal factors that contribute to the self-management of type 2 diabetes, the authors determined that individuals with avoidant coping styles were less likely to check their glucose levels frequently and more likely to perceive blood glucose monitoring as a burden. As might be expected, participants possessing this coping style tended to use distraction to prevent focusing on their diabetes related self-care and recommended self-management behaviors. With the purpose of further exploring the specific personality traits and coping styles of individuals with type 2 diabetes, Samuel-Hodge et al. (2008) studied the coping styles of African Americans with type 2 diabetes. The emotive coping style (i.e., worrying, anger, nervousness, and depression), the passive coping style (i.e., denial), and the active coping style (i.e., actions and making plans) were measured with an adaption of the Jalowiec coping styles measure (Jalowiec, Murphy, & Powers, 1984). The results of the study suggested that more active forms of coping have a positive effect on type 2 diabetes related self-care behaviors.

A considerable body of research has established that negative emotions such as fear, anger, anxiety, and sadness are a common part of living with type 2 diabetes (Adriaanse et al., 2008; Arroyo et al., 2004; Decoster, 2003; E. B. Fisher et al., 2007). In an effort to characterize the spectrum of emotions experienced by those living with type 2 diabetes, Decoster (2003) conducted an exploratory, qualitative study of non-Latino Whites and African American adults from a health care clinic that served the working poor. The average participant was female, diagnosed for twelve years, self-managed with a combination of diet, exercise, and insulin injections, and possessed at least one significant diabetes related physical complication. Thirty-four subjects reported 76

emotional experiences, using 32 emotional terms. The terms were organized into seven categories: anger, anxiety, guilt, happiness, irritation, and sadness, with fear, irritation, and sadness appearing most frequently. African American subjects reported fear (30%), sadness (19%), and anger (15%) most frequently, in contrast to White participants who reported fear (27%), irritation (23%), and sadness/anger (17%). Although positive emotional responses to living with type 2 diabetes were not frequent (10% in White participants and 7% in African American participants), it should be noted that participants also indicated that managing their type 2 diabetes resulted in happiness, joy, feeling good about the ability to meet self-management goals, relief associated with early diagnosis, and hopefulness that the diagnosis would lead to treatment and better health. Although exploratory, Decoster's analysis is significant because it characterized the emotional landscape of living with diabetes, captured the overwhelmingly negative emotional experience, and integrated culture as a potential factor in participants' emotional responses. Confronting the emotional challenges of this population and developing an understanding of the cultural context (i.e., race/ethnicity, sex, socio-economic status, geographical location, age of onset) of the individual living with type 2 diabetes is essential to developing appropriate intervention and prevention programs.

Type 2 Diabetes and Mood Disorders

Conservative estimates indicate that persons with type 2 diabetes are diagnosed with a depressive disorder at three times the rate of the non-diabetic population, and the challenge of high prevalence rates are compounded by under-diagnosis and inadequate treatment (Peyrot & Rubin, 1997; Rubin & Peyrot, 2001). As might be expected, higher

rates of depression tend to occur in persons who have multiple diabetes related complications. Also, it has been reported that lower quality of life and depression are more likely to occur in persons with diabetes who are insulin dependent as opposed to those who are able to effectively manage glucose levels with a combination of diet, exercise, and oral medications (Aikens et al., 2008). It is clear that the progression of depression in this population is arduous, having been described as "chronic and severe" (Rubin & Peyrot, 2001, p. 461). Most people with type 2 diabetes who are diagnosed with major depression experience a depression relapse within five years of diagnosis and an average of four depressive episodes during the same five-year period (Lustman, Griffith, & Clouse, 1996; Rubin & Peyrot, 2001). It is not clear why depressive episodes within the type 2 diabetes population tend to be more severe; however, it has been hypothesized that the co-occurrence and seemingly synergistic relationship between the depression and glucose intolerance may be caused by related neuroendocrine imbalances (Haupt & Newcomer, 2002).

Given the significant co-occurrence of depression and type 2 diabetes, determining whether there is a causal connection between the two disorders has been a subject of study. Mezuk, Eaton, Albrecht, and Golden (2008) reviewed prospectively designed studies that provided sufficient data to calculate a relative risk estimate, included subjects with type 2 diabetes, and excluded studies of subjects with prevalent cases of depression or diabetes at baseline. From the 21,190 studies that were gathered, 18 studies met the selection criteria. A pooled relative risk using random effects was calculated, and analyses to determine type 2 diabetes predicting depression and

depression predicting type 2 diabetes were run. The results indicated a strong positive association between depression and type 2 diabetes, with depression accounting for a 60% increase of type 2 diabetes risk. However, the results indicated a weak association between diabetes and depression risk. According to the authors depression may predict the onset of type 2 diabetes, but type 2 diabetes does not predict the onset of clinical depression. These findings are significant because they suggest that the physiological conditions that precede depression are consistent with the biological environment that encourages the onset of type 2 diabetes. Further study is warranted to determine whether the early detection and treatment of depression can significantly reduce type 2 diabetes risk.

Anderson et al. (2001) conducted a meta-analysis of studies that measured the lifetime prevalence of clinical depression in adults with type 2 diabetes. Thirty-nine (39) studies that included 20,218 participants were used to calculate odds ratios, which were used to compare the odds of depression in diabetic groups to non-diabetic groups. The authors found that the rates of depression in the type 2 diabetes groups were twice the rates found in the non-type 2 diabetes groups. Further, the chance of depression was higher in diabetic women (28%) than in diabetic men (18%), results consistent with the prevalence of depression in the general population. In a subsequent study, Adriaanse et al. (2008) conducted a study of 276 men and 274 women with the purpose of determining whether there was an association between depressive symptoms and impaired glucose metabolism and type 2 diabetes. The participants were given the Centre for Epidemiologic Studies Depression Scale (CESD), a measure of the frequency of

depressive symptoms over the previous 7 days, and their glucose metabolism statuses were measured following fasting and post-glucose loading. The results indicated that depressive symptoms were higher in women with impaired glucose metabolism and type 2 diabetes compared to women with normal glucose metabolism. An interesting finding of this study was that depressive symptoms were not associated with impaired glucose metabolism in men. The authors attributed this finding to lower male participation in the study.

The consideration of the co-occurrence of diabetes and the spectrum of negative mood states—negative coping styles, symptoms of depression, and depressive disorders—is important because there is a strong association between these negative affective conditions and greater difficulty in meeting type 2 diabetes self-management demands (Dimatteo, Lepper, & Croghan, 2000; Egede et al., 2003; Gonzalez et al., 2008; Lustman & Clouse, 2002; Rubin & Peyrot, 2001; Rush, Whitebird, Rush, Solberg, & O'Conner, 2008; Ziegelstein et al., 2000). Ciechanowski et al. (2000) explored the impact of depressive symptoms on type 1 and type 2 diabetes self-management outcomes. Participants (n = 367) completed Hba1c screenings and the depression subscales of the Hopkins Symptom Checklist, the Diabetes Knowledge Assessment, the Summary of Diabetes Self-Care Activities (a measure of self-care behaviors and the percentage of activities actually performed as recommended by a physician), and the Short-Form 12 Health Survey (a measure of general health and functioning). Data regarding diabetes complications, disease duration, and whether insulin was prescribed at diagnosis were also collected. Medication nonadherence was determined from

interruptions of medication treatment. The data analysis indicated a significant association between diminished diabetes self-care behaviors and depressive symptoms. Specifically, adherence to dietary amount recommendations was significantly worse for participants with medium to high depression severity. Further, there was a significant negative association between depression and the number of days of oral hypoglycemic medication interruption. In a subsequent study of type 1 and type 2 diabetes patients conducted by Ciechanowski, Katon, Russo, and Hirsch (2003), the researchers hypothesized that there would be a significant association between higher levels of depression, lower diabetes self-care, greater diabetes symptom reporting, and lower physical functioning. After controlling for diabetes type and related complications, the results indicated that depressive symptoms were significantly associated with lower adherence to dietary and exercise recommendations, poorer physical functioning, and higher diabetes related symptom reporting. The authors speculated that the changes caused by depression (i.e., appetite changes and reduced energy and motivation) may significantly affect adherence to diet and exercise recommendations.

The aforementioned studies illustrate that problems with coping style (i.e., hostility, cynicism, anger, and denial), mood disorders, and self-management that are frequently experienced by the type 2 diabetes population. A consideration of mood related conditions is important because it is apparent that these conditions have the potential to negatively influence the ability to engage in effective self-management behaviors. In the next section, a diabetes specific condition, diabetes-related distress (DRD), will be discussed. DRD is similar to negative coping style and mood disorders in

its presentation, but distinguished by the influence of disease and relational factors. DRD is similar to the other mood conditions discussed here in that individuals who experience DRD are less likely to participate in positive self-management behaviors. In the next section, DRD will be presented as a distinct condition with different treatment implications.

Diabetes-related Distress (DRD)

Despite the significant research linking negative coping, depressive symptoms, mood disorders, and type 2 diabetes, recent studies indicate that the presence of symptoms that are consistent with depression may actually be indicators of diabetes-related distress (DRD) (Polonsky et al., 1995, 2005). DRD involves the ". . . significant negative emotional reactions to the diagnosis of diabetes, threat of complications, self-management demands, unresponsive providers, and/or unsupportive interpersonal relationships . . ." (Gonzalez et al., 2011, p. 236). Paddison, Alapss, and Stephens (2007) conducted a study with the purpose of exploring the relationships between cognitive patterns and levels of diabetes-related distress. The authors hypothesized that cognitive perceptions about diabetes would account for a significant amount of variance in measurable diabetes-related distress. Men and women (n = 113) with an average of 7.7 years since type 2 diabetes diagnosis were included in the study. Participants completed the Problem Areas in Diabetes Questionnaire (PAID), a measure of diabetes-related distress (Polonsky et al., 1995, 2005) and the Illness Perceptions Questionnaire (IPQ-R), a measure of cognitive illness representations (Moss-Morris et al., 2002). The results indicated moderately strong positive relationships between DRD and diabetes identity,

symptom fluctuations, and diabetes related consequences. Significant negative relationships were found between DRD, treatment control, and diabetes related knowledge. These results are significant because they suggest the utility of disease specific cognitive therapies in individuals with type 2 diabetes in order to help mitigate the distress associated with fluctuating symptoms and managing the many physical consequences of the disease. The authors noted that clinicians should be frank but sensitive to the legitimate concerns about the serious consequences of the disease, carefully address the concerns such that avoidant reactive behaviors that interfere with self-management are minimized, and be present to help individuals plan for the frustration of fluctuating symptoms.

Although the mood related issues of this population have long been documented, the assessment of DRD is a newer development in the type 2 diabetes literature. In the following paragraphs, a line of studies (L. Fisher, Mullan et al., 2008; L. Fisher, Skaff, et al., 2008; L. Fisher et al., 2010) that distinguishes DRD from other mood related conditions and represents DRD as an essential consideration in effective diabetes care is presented. E. B. Fisher et al. (2007) were concerned that the most frequently reported methods for measuring depressive symptoms (i.e., Beck Depression Inventory [BDI], the Center for Epidemiological Studies Depression [CESD], and the Patient Health Questionnaire-9) in type 2 diabetes research did not take contextual factors into account. Although some studies included diagnostic interviews to corroborate the checklist-type assessments, the researchers were concerned that the results of follow-up diagnostic interviews were limited due to verification bias. In order to determine whether the

checklist-type assessments were valid measures of depressive symptoms and depressive disorders in the type 2 diabetes population, E. B. Fisher et al. (2007) compared the diagnostic results from depressive symptom questionnaires and diagnostic interviews. The researchers also sought to determine whether the clinical implications of depressive symptom scores were the same as the implications of depressive disorders with respect to their relationships to diabetes-related distress, self-management, and biological indicators. Participants (506 diagnosed with type 2 diabetes, ages 21-75, with no diagnosis of serious diabetes-related complications, active psychosis, or dementia) were recruited to participate in a three-phase longitudinal study. At phase 1 participants completed a structured interview depression assessment (i.e., the depressive disorders module of the Composite International Diagnostic Interview [CIDI]), a checklist depressive symptom assessment (i.e., CESD), and a measure of diabetes-related distress (i.e., Diabetes Distress Scale [DDS]). The researchers found a significant correlation between CESD and DDS scores ($r = 0.48$; $P < 0.001$) suggesting that depressive symptoms are connected to DRD. The results of the first phase indicated that the depression instrument was measuring diabetes-related distress, suggesting the possibility of false depression diagnoses. Another interesting finding that is within the scope of the investigation of the current study is that those participants who scored above the cut off point on the CESD also reported indicators of poor type 2 diabetes self-management such as higher Hba1c levels, higher calorie and saturated fat consumption, and lower physical activity.

In the second and third phases of the study (L. Fisher, Skaff, et al., 2008; L. Fisher, Mullan, et al., 2010), the researchers attempted to further explicate the connection between affective disorders and diabetes-related distress. At the 9 month (phase 2) and 18 month (phase 3) points of the study, participants were again assessed for Hba1c level, diabetes-related distress (as measured by the DDS), depressive symptoms (as measured by the CESD), and co-morbidity of major depressive disorder, dysthymia, general anxiety disorder, and panic disorder (as measured by the CIDI structured interview). Comparisons of the results over phase 1, phase 2, and phase 3 revealed that participants demonstrated rates of anxiety and affective disorders that were much higher than would be expected in a sample of community adults, and the percentage of participants with high depressive symptoms and diabetes-related distress was higher than the percentage of participants with affective and anxiety disorders. There were no significant differences in mean Hba1c levels across the study phases. No significant correlations were found between Hba1c and affective or anxiety disorders. However, at phase 1 significant positive correlations were found between Hba1c and depressive symptoms and Hba1c and diabetes-related distress.

A time concordant analysis of the three affective variables (CESD, MDD, and DDS) demonstrated a significant positive relationship between Hba1c and DDS (b = 0.024, P = 0.001). An independent time-concordant analysis also indicated a significant positive relationship between Hba1c and DDS (b = 0.023, P = 0.001). No statistically significant cross-sectional, prospective, or time-concordant relationships were found between Hba1c and MDD (L. Fisher et al., 2010). Further, the researchers found that

participants displaying a diagnosis at any point during the study period demonstrated significant increases in anxiety and affective disorders over the 18-month period.

The findings from this line of studies (L. Fisher, Glasgow, et al., 2008; L. Fisher, Mullan et al., 2008; L. Fisher, Skaff, et al., 2010) are significant for several reasons. The studies demonstrate that there are significantly different correlational and predictive relationships between depressive symptoms, major depressive disorders, diabetes-related distress (DRD), and elevated Hba1c levels. Because each negative mood state condition is similar in patient presentation, and depression measures frequently do not integrate contextual factors (i.e., living with a chronic disease and negotiating challenging relationships), there is the potential for clinical depression to be diagnosed falsely, when DRD is the more accurate result. Although further study is warranted in this area, these findings suggest that DRD is a significant phenomenon of which depressive symptoms and other affective struggles are but one part. Further, the results of this line of studies indicate the likelihood of a significant relationship between DRD and one of the major indicators of long-term type 2 diabetes self-management, Hba1c score. Individuals with type 2 diabetes who experience significant diabetes-related distress are more likely to benefit from interventions designed to reduce the emotional and cognitive stressors associated with diabetes specific demands, such as the mindfulness-based practices discussed earlier. In addition, it is possible that DRD may impact the relationship between mindfulness and the ability to engage in more effective type 2 diabetes self-management.

In the previous section the co-occurrence of type 2 diabetes and negative coping style, negative mood and mood disorders, and diabetes-related distress was discussed. The literature reviewed here illustrates that the co-occurrence of negative mood conditions, particularly diabetes-related distress, is central to the experience of living with type 2 diabetes. Further, it is apparent that the co-occurring mood conditions negatively impact the ability to maintain effective type 2 diabetes self-management, and thus could impact the relationship between healthful practices, such as mindfulness, and diabetes self-management. In the next section, the prominent research regarding the self-management of type 2 diabetes will be discussed. Particular attention will be given to distinguishing between models that utilize didactic and experiential-based models and interventions.

Self-Management

Type 2 diabetes is a chronic disease because there is no known cure; therefore, those who are diagnosed must manage the disease and associated conditions throughout their lives. Redman (2011) defined chronic disease management as "the ability to detect and manage the symptoms and treatment, physical and psychological consequences, and lifestyle changes inherent in living with chronic conditions, which a particular patient may be able to do to a greater or lesser extent" (p. 181). This definition of self-management implies that some patients may not be able to effectively self-manage their conditions such that the most problematic symptoms are avoided or delayed. In addition to the emotional barriers to successful type 2 diabetes self-management discussed in the previous section (i.e., problematic coping styles, symptoms of depression, mood

disorders, and diabetes-related distress), other barriers to effective self-management include inadequate patient education and preparation, poor social support, and a physical environment not conducive to physical activity or healthy food choices.

Although the self-management of type 2 diabetes relies heavily on the diagnosed individual's day-to-day behaviors, the process of effective self-management involves relationships between the individual and a social context that includes health care providers. Because collaborative relationships with health care providers are key to successful self-management, the current chronic disease management literature has eschewed the concepts of *treatment adherence* and *compliance* in favor of a patient centered approach that encourages patient autonomy and empowerment. This perspective includes patients and health care providers as necessary partners in creating effective self-care plans (Glasgow & Anderson, 1999).

In the following section, the most prominent disease self-management studies and models will be reviewed. This review is important because it will help clarify the self-management process from the broader context of chronic disease self-management and the more specific context of type 2 diabetes self-management. Further, particular attention will be given to the theories and models that integrate elements of mindfulness and suggest opportunities for the use of mindfulness-based approaches and interventions.

Chronic Disease Self-Management

Adaptation to life with chronic disease is a necessary process of weaving self-care behaviors into the fabric of the diagnosed person's life experience. An individual's ability to successfully adapt to the disease diagnosis is considered critical to the

development of effective self-care behavior patterns. Accordingly, research has focused on the adaptation process as a critical element of the disease self-management process (Fournier, de Ridder, & Bensing, 2002; Schreurs & de Ridder, 1997; White, Richter, & Fry, 1992). A frequently cited model of chronic disease management, the *Roy Adaptation Model*, explained that the individual is a dynamic force that interacts with focal, contextual, or residual stimuli (Roy & Andrews, 1991; Roy & Andrews 1999). Using the *Roy Adaptation Model* as conceptual support, Pollock (1993) developed the *Adaptation to Chronic Illness Theoretical Framework* (see Figure 4).

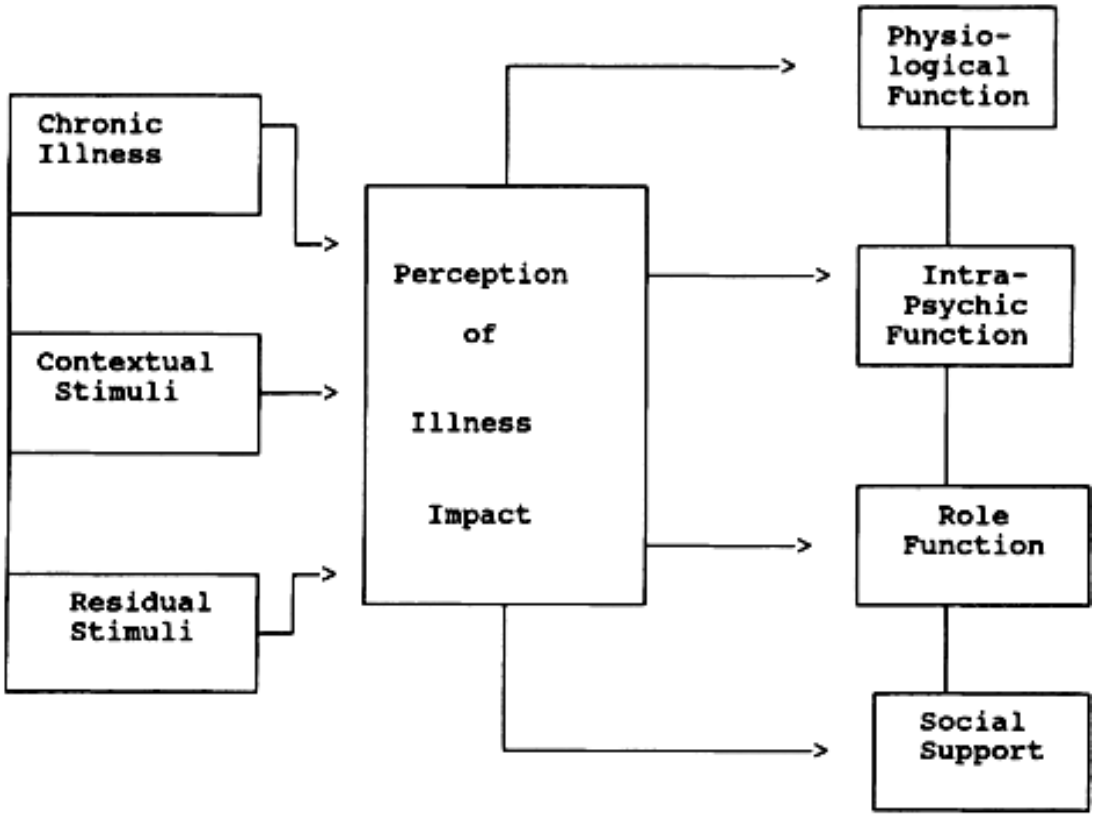

Figure 4. The Adaptation to Chronic Illness Theoretical Framework. From "Adaptation to Chronic Illness: A Program of Research for Testing Nursing Theory," by S. E. Pollock, 1993, *Nursing Science Quarterly*, *6,* 86–92. Copyright 1993 by Sage Publications. Reprinted with permission (see Appendix N).

Central to the framework is the concept of *Perception*, which becomes a filter that influences the nature of behaviors and the quality of the adaptation to the illness. The *chronic illness* component of the framework refers to the morbidity and mortality associated with the condition. The *contextual stimuli* component refers to the demographic, health promotion activities, and participation in patient education programs, and the *residual stimuli* component refers to any potentially unknown factor that might influence the development of the condition. The individual is capable of adapting through processes that involve physiological, intrapsychic (i.e., self-concept), role function (i.e., work, family, community), and social support (i.e., interdependence) functions. Resulting behaviors are manifestations of these processes and are indicators of how well the individual is adapting while interacting with the environment. The resulting adaptation process is considered integrated (i.e., managing different challenges), compensatory (i.e., drawing upon alternative resources in order to meet challenges), or compromised (i.e., failing to meet challenges) depending on how well the individual's internal and external resources meet the situational demands. *The Adaptation to Chronic Illness Framework* is significant because it provides an illustration of how the individual's perception of illness and contextual factors combine to influence self-management behavioral outcomes.

In a contribution to the counseling literature, Livneh and Antonak (2005) integrated quality of life (QOL) within a framework for understanding the adaptation to chronic illness process. The authors premised their discussion with assumptions that the adaptation to illness process includes experiences of crisis, stigma, uncertainty, grief and

loss, loss of positive body image and self-concept, and post-illness QOL. Disengagement (i.e., avoidance oriented, self and other blame, and substance abuse) and engagement (i.e., social support, problem solving) are discussed as the two main types of coping styles that affect post-illness QOL. The authors concluded that engagement strategies encourage higher levels of well-being, disease acceptance, and successful illness adaptation (Livneh & Antonak, 2005).

Adapting to chronic illness is a process that requires the consideration of multiple contextual factors. Nosek (2005) applied a holistic model to chronic disease management exploring the idea that people with chronic health concerns can achieve optimal health in the physical, psychological, and social dimensions. Nosek did not suggest that achieving health for persons with disabilities or chronic illnesses is a simple process; however, health is possible when the personal, societal, and environmental components of wellness are addressed. According to the model, physical, psychological, social, and spiritual health outcomes are influenced by individual, contextual, and psychosocial factors. According to Nosek, some factors such as family history and sex cannot be altered; however, other factors such as self-efficacy and self-esteem can be improved.

Nosek's holistic model is significant because it emphasizes the importance of individual strengths that can be utilized to offset the painful features of the disease that can negatively affect well-being. In the case of self-management for the individual with type 2 diabetes, overcoming personal and environmental barriers might include identifying foods that are healthy and culturally familiar, identifying safe and convenient locations to exercise, and identifying family and friends who can provide emotional

support. The models discussed in this section illustrated the complexity of the disease adaptation process and introduced the centrality of contextual factors. In the next section, self-management models specific to type 2 diabetes self-management will be discussed.

Type 2 Diabetes Self-Management

Whittemore and Roy (2002) applied the *Adaptation to Chronic Illness Theoretical Framework* to type 2 diabetes in the *Adapting to Diabetes Mellitus Model* (see Figure 5). In the *Adapting to Diabetes Mellitus Model* self-management behaviors are incorporated under the model's broader category of *Health Promoting Behaviors*. Citing Hernandez (1995, 1996), the authors described a process of *integration* whereby the individual interweaves specific treatment recommendations into a lifestyle that is consistent with the requirements of daily living, relationships, and self-concept. Optimally, individuals achieve *health-within-illness* such that all aspects of life pertaining to health *and* illness become seamless parts of the psychosocial experience. According to Whittemore and Roy (2002) health-within-illness, ". . . reflects the experience of harmony, acceptance, and maximization of health potential within the lived experience of chronic illness" (p. 315).

It is clear that the factors that contribute to type 2 diabetes management are extensive. Brody, Jack, McBride Murray, Landers-Potts, and Liburd (2001) proposed a heuristic model of the contextual and conceptual processes that potentially affect type 2 diabetes management in African American adults (see Figure 6). The model illustrates a complicated web of community barriers and supports (i.e., structural, crime and violence, racism, social support, and religious involvement), insurance availability and utilization,

diabetes-related education (i.e., patient education, small group, and home education), healthcare provider-patient relationships (i.e., communication skills, patient satisfaction and involvement, and quality of care), extended family processes (i.e., support and structure), and psychological functioning (i.e., depression, optimism, and self-efficacy) that are indirect factors in the process of managing type 2 diabetes and achieving control over glucose levels. The authors concluded that a clearer understanding of these pathways has the potential of generating better education and counseling interventions (Brody et al., 2001).

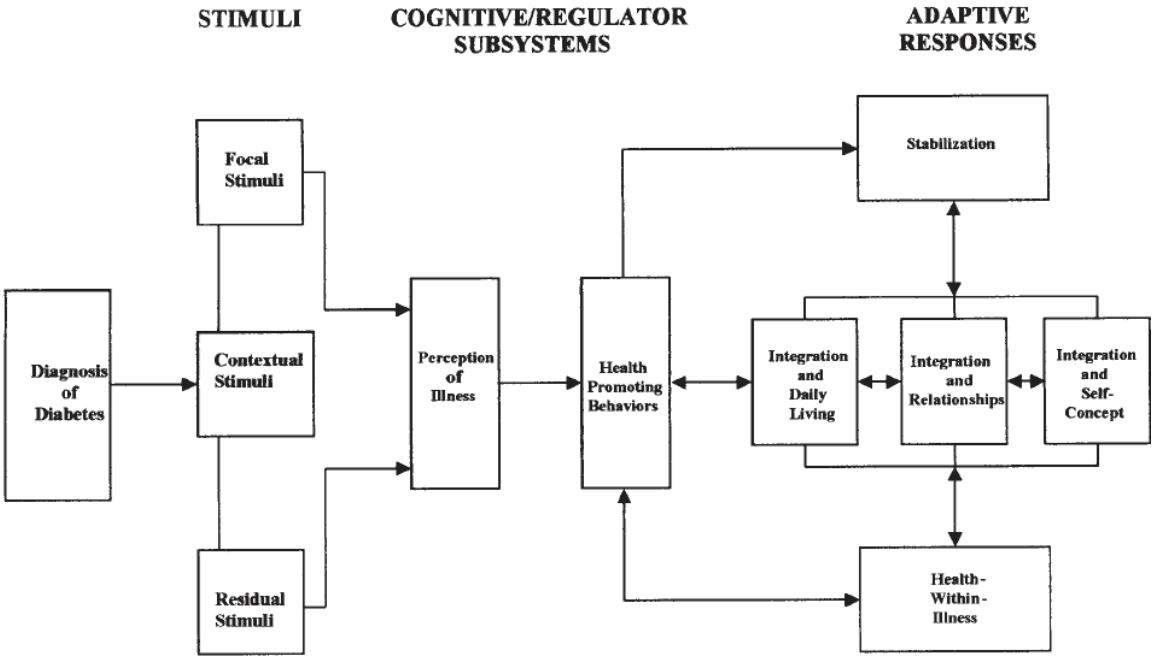

Figure 5. Adapting to Diabetes Mellitus. From "Adapting to Diabetes Mellitus: A Theory Synthesis," by R. Whittemore & S. C. Roy, 2002, *Nursing Science Quarterly, 15*, 311–317. Copyright 2002 by Sage Publications. Reprinted with permission (see Appendix N).

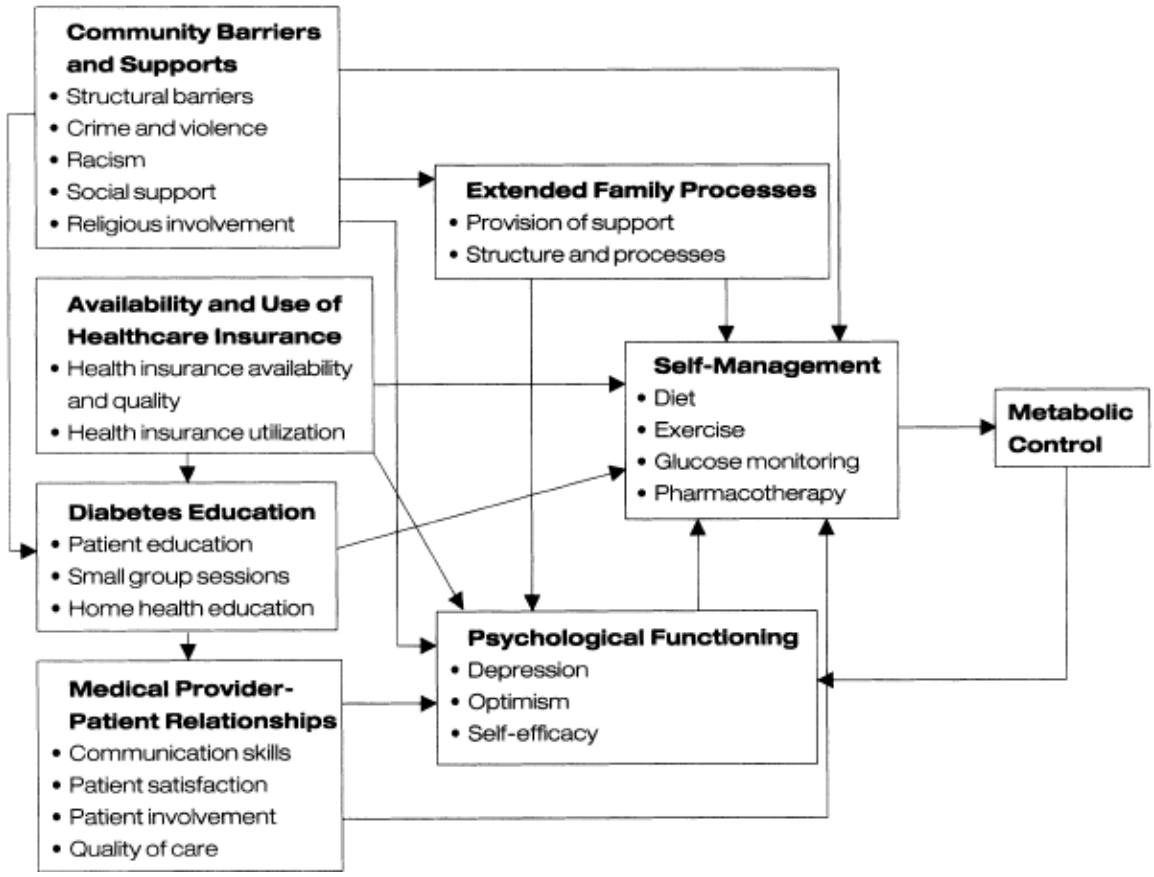

Figure 6. Heuristic Model of Conceptual and Contextual Processes That May Influence Adoption of Self-Management Regimens. From "Heuristic Model Linking Contextual Processes to Self-Management in African American Adults with Type 2 Diabetes," by G. H. Brody, L. Jack, V. M. Murray, M. Landers-Potts, & L. Liburd, 2001, *The Diabetes Educator, 27,* 685–693. Copyright 2001 by American Association of Diabetes Educators. Reprinted with permission (see Appendix N).

There is consensus among diabetes educators and researchers that the self-management of type 2 diabetes requires day-to-day reasoning and problem solving skills in order to negotiate the complicated contextual demands of the disease (Hill-Briggs, 2003). According to the problem-solving model of disease management, effective and ineffective management behaviors are determined by different patterns of problem solving. Theoretically, effective management decisions are associated with positive

attitudes and beliefs relative to disease related problems, a rational approach to problems, the transfer of learning from past experiences to new experiences, and a sufficient "store" of information that can be applied to new problems. Hill-Briggs, Cooper, Loman, Brancati, and Cooper (2003) conducted a qualitative study with the purpose of comparing the diabetes related problem-solving behaviors of African Americans with good and poor diabetes control. The study was organized around a theoretical model of problem solving (Hill-Briggs, 2003) that integrated four components of disease related problem solving: (a) problem-solving orientation—the individual's attitudes and beliefs about managing the disease in relation to disease related problems that can serve as positive or negative motivating factors, (b) problem-solving process—the individual's approach toward problems that can either be effective/rational, or ineffective/careless, impulsive, or avoidant, (c) transfer of past experience—how the individual applies past experiences with the disease in future situations that can be positive or negative, and (d) disease specific knowledge—the individual's stored information about the disease and how it can be managed.

In order to test the first three components of the model, Hill-Briggs et al. (2003) conducted two focus groups of urban African Americans with type 2 diabetes: one group composed of good diabetes control participants (n = 8) and the other group composed of poor diabetes control participants (n = 7). Interestingly, more of the poor control participants indicated having had formal diabetes education and a visit with a dietician or nutritionist about their diabetes in the past, despite having significantly higher Hba1c scores and poorer self-reported adherence to diabetes self-management behaviors (i.e.,

medication usage, diet, and exercise). Both groups indicated that diet was the most problematic self-management behavior followed by managing physical pain, integrating self-care into daily living, and managing diabetes-related stress. However, the good diabetes control group indicated a rational and predominately positive orientation toward positive problem-solving as compared to the poor control group who reported a predominately negative attitude toward diabetes related problems. The good control group reported patterns of setting and modifying goals and generating alternative behaviors for problem situations as compared to the poor control group who reported carelessness, inconsistency, and avoidance in performing behaviors related to their diabetes regimen. Instead of the frustration and anger that was found in the poor control group, the good control group reported gaining confidence in their abilities to meet problems as they arise and expecting their self-care efforts to lead to positive health outcomes. Good control participants reported transferring their learning from good and bad past situations as opposed to the poor control group who tended to report that their learning from past experiences was not based on their own experiences, but on the experiences of others. The predominant themes found in this study were consistent with the problem-solving model, although not mutually exclusive; participants from each group indicated positive and negative problem-solving behaviors but to varying degrees. However, avoidant problem-solving behaviors were only expressed in the poor control group. The authors noted that although the results of this qualitative study are not generalizable, the study does provide support for further examination of the role of

orientation toward problem-solving, problem-solving processes, and transfer of past learning to current situations in the context of type 2 diabetes self-management.

The adaptation, contextual, and problem-solving models of type 2 diabetes management illustrate type 2 diabetes self-management as a complicated process that involves personal, relational, and cultural considerations. In the next section, disease management models will be presented in terms of how the disease learning process is conceptualized.

Didactic and Experiential Models

Elliot P. Joslin, M.D., founder of the renowned Joslin Clinic in Boston, MA, developed the first type 2 diabetes education protocols published in, *The Treatment of Diabetes Mellitus* (1916) and *A Diabetic Manual for the Mutual Use of Doctor and Patient* (1919). A strong advocate for patient autonomy through education about the disease, Joslin was the first clinician to recognize the importance of educating patients on the importance of diet (particularly a carbohydrate controlled diet), exercise, foot care, and the administration of insulin. Joslin remained on the forefront of diabetes research developing the first hospital blood glucose monitoring device in 1940 and bringing diabetes to the fore as a serious public health issue. Although Joslin was criticized and his practices reluctantly accepted by the American Diabetes Association (ADA), his methods have become the gold-standard in type 2 diabetes patient education and are currently taught in Joslin affiliated centers throughout the United States.

Despite the predominance of education-based models of treatment, researchers and clinicians have begun to question the intense focus on diabetes education and

attribute the difficulty of managing type 2 diabetes to the over-reliance of health care professionals on education-based models that encourage tight glucose control and the under-utilization of experiential-based models that encourage integration of diabetes self-care principles into the individual's lifestyle. The poor compliance outcomes resulting from this focus on knowledge and skill acquisition has prompted researchers to consider other diabetes self-management approaches (Norris, Engelgau, & Narayan, 2001; Hunt, Pugh, & Valenzuela, 1998; Price, 1993; Rayman & Ellison, 2000).

Whereas there is widespread acknowledgement that a thorough understanding of the behaviors needed to effectively manage type 2 diabetes is necessary, the medical literature has documented the challenges and inadequacies of the more traditional, didactic styled approaches at improving self-management behaviors (Clement, 1995; de Weerdt, Visser, & van der Veen, 1989; Karas Montez & Karner, 2005; Matthews, Peden & Rowles, 2009; Norris et al., 2001; Ockleford et al., 2008; Schlenk & Hart, 1984). High diabetes self-management noncompliance rates have been attributed to: (a) lack of education because compliant behaviors (i.e., adhering to recommended diet, exercise, and medication, and frequent blood sugar monitoring) require that the diagnosed individual be educated on the behaviors, (b) inadequate self-efficacy in one's ability to exercise the necessary behaviors, and (c) a focus on strict control over the myriad of social and lifestyle contexts encountered while attempting to engage in self-management behaviors (Hernandez, 1995; Hunt, Arar, Larme, Rankin, & Anderson, 1998; Schoenberg, Amey, & Coward, 1998).

S. A. Brown (1990) conducted a meta-analysis of 82 type 2 diabetes education intervention studies in order to determine the effects of patient education interventions on patient knowledge, self-care behaviors, metabolic control, and anxiety and coping. The authors found that education groups were related to significant increases in knowledge; however, education interventions alone resulted in small positive changes in psychological outcomes and were insufficient to encourage self-management behaviors or glucose control. As a result, researchers have begun to conclude that the effects of education alone on self-management outcomes are, at best, small (Brody et al., 2001). Alternatives to the education-based approach include methods that place the individual experience as central to the process of effective self-management.

Martha Price's 1993 publication, *An Experiential Model of Learning Diabetes Self-Management*, was designed to explore the inherent uncertainty that is part of living with diabetes, and how self-management is learned despite the persistently changing character of the disease. Price's work was the first of several qualitative inquiries that focused on how the individual learns the self-management of diabetes. Price conducted a qualitative study using grounded theory methodology of 18 adults with diabetes. The interview questions focused on the "unknowns" or "puzzling situations" of the lived experience of people with diabetes in order to target the "personally salient" data regarding the individual experience of uncertainty within the context of living with diabetes. The data revealed 11 principal categories: (a) personal profile/characteristics; (b) personal significance and meaning of diabetes; (c) social comparison; (d) time of diagnosis; (e) self-managing; (f) accepting the diabetes; (g) experiencing body changes

(i.e., body listening); (h) continuing uncertainty; (i) controlling diabetes in terms of the self, body, and mind; (j) uncertainty with health care providers; and (k) family response/support. The 11 principal categories were reduced to four principal factors: (a) personal considerations, (b) monitoring, (c) cognitive skills, and (d) control, which were reduced again to one centralizing category: *learning self-management of diabetes*.

The four major categories became the basis for the *Diabetes Self-Management Model* (DSMM) (Price, 1993). The DSMM is comprised of two phases and complementary stages. Phase 1, *Getting Regulated*, is comprised of Stage 2 *Figuring it out* (i.e., patient modifies prescribed regimen and is characterized by allowing some flexibility to the regimen), Stage 3 *Trial and error* (i.e., patient intensifies effort to find regimen "fit" and "what works for me"), and Stage 4 *Basic routine* (i.e., identifies patterns and a self-management regimen that "usually works for me"). Phase 2 of the DSMM, *Being Regulated*, is comprised of Stage 4 *Basic routines* (i.e., Stage 4 of Phase 2 continues the basic routine of Phase 1 and is characterized by greater trust of self to handle life situations), and Stage 5 *Application* where the patient applies the basic routine to new diabetes situations. The principal factors developed in Price's research (personal considerations, monitoring, cognitive skills, and control) are evident throughout the DSMM. These factors reflect the importance of reflection on individual circumstance, a learned appreciation for the subtle changes in the body (i.e., self-awareness), the ability to make decisions based on the awareness of subtle changes in the body (i.e., self-regulation), and the recognition of personal choice in an ongoing set of behaviors that promote a sense of control over the condition (i.e., individualized self-management plan).

The *Diabetes Self-Management Model* is significant because it represents a patient-centered model of diabetes self-management and movement away from a prescriptive model that labels patient behavior that deviates from the treatment plan as noncompliant. Individual experience and knowledge of self are key components of the model. The model is significant because it has encouraged further study of the issues of patient autonomy, body listening, and self-awareness in the diabetes literature. Following Price (1993), several researchers continued to explore the potential benefits of experiential-based models of diabetes self-management (Hernandez, 1996; Hernandez, Antone et al., 1999; Hernandez, Bradish, Laschinger, Rodger, & Rybansky, 1997; Hernandez et al., 2008; Ingadottir & Halldorsdottir, 2008). The results of Hernandez (1991) and Hernandez (1996) indicated that individuals could successfully achieve good metabolic control (as indicated by Hba1c scores) by incorporating listening to internal body cues and sensations and integrating diabetes management behaviors into their lifestyles, without making the disease the central focus of their lives. Another significant finding in these studies was that individuals were able to maintain good metabolic control without strict compliance to the regimen prescribed by their health care providers.

Hernandez et al. (1997) asserted that prescriptive models actually have the potential for contributing to self-management uncertainty because the list of taught symptoms frequently differs by individual and context. Consistent with this approach, later research explored the importance of developing individualized ways of living with diabetes (Hernandez, Antone, et al., 1999; Hernandez, Bradish, et al., 1999), an appreciation for the role of self-knowledge in effectively living with diabetes (Ingadottir

& Halldorsdottir, 2008), and the role of self-awareness in the lives of persons with diabetes (Hernandez et al., 2008). These studies have provided the groundwork for the exploration of the presence of the mindfulness trait in those who are able to engage in effective type 2 diabetes self-management behaviors. These studies have also provided support for the use of mindfulness interventions in the type 2 diabetes population in order to encourage mindful self-awareness and self-regulation (Rosenzweig et al., 2007; Surwit, 2005).

Curtin and Lubkin (1990) developed a conceptualization of life with chronic illness characterized by a tension between the individual's response to the diagnosis and the effects of the disease and the processes of adapting to and managing the disease. The adaptation and management processes occur simultaneously as the diagnosed person comes to terms with the chronic nature of the disease, developing the relationships and learning the skills necessary for management. Building on Curtin and Lubkin's conceptualization, Paterson, Thorne, and Dewis (1998) conducted a meta-analysis of the qualitative studies from the nursing, social science, and allied health literature in order to further illustrate the experience of diabetes self-management. The predominant theme that emerged from the meta-analysis was the importance of determining and maintaining *balance*. The need for balance was expressed in the decision to assume control over the disease by understanding body responses, learning disease management skills, adopting a combination of diet, exercise, and medication that was congruent with lifestyle and cultural norms, and fostering relationships that were supportive of self-care efforts.

In a later study, Paterson and Thorne (2000) applied Paterson, Thorne, and Davis (1998) to the process of developing type 1 diabetes self-management expertise. The authors conducted a qualitative study to explore the self-management behaviors of 22 individuals designated as "expert self-management decision makers" because of more than 15 years of demonstrated ability to make sound self-management decisions and maintain good glycemic control. Participants characterized active control as a shift from being *controlled* to *controlling the disease*. Participants were also characterized by the development of confidence in the ability to make good decisions, routine, social support in the form of family members and physicians, and maintenance of vigilant attention to body changes. The resulting *Development of Expertise in Diabetes Self-management Model* illustrates movement through four non-distinct, fluctuating phases as influenced by the individual's age of onset and developmental age: (a) passive compliance (i.e., rigid adherence to rules); (b) naive experimentation (i.e., trial and error manipulations prompted by a need for control without the necessary body knowing or disease information to make effective decisions); (c) rebellion (i.e., denial of the diabetes and ignoring diet restrictions and medications motivated by the desire for normalcy); and (d) active control (i.e., the ability to mediate the effects of the disease while maintaining a sense of personhood and relationships with others). Although the study and model development were conducted with a sample of adults with type 1 diabetes—a related condition that is characterized by the inability of the pancreas to produce insulin as opposed to the compromised insulin production and insulin resistance that are characteristic of type 2 diabetes—the results are applicable to those with type 2 diabetes.

The authors stated, "[e]xpert self-care arises from individuals' awareness of their own bodies and what works best for them" (p. 402).

Elements of the *Development of Expertise in Diabetes Self-management Model* are present in later studies that were designed to determine the expert patterns of self-management in persons with chronic disease and explore the 'lived experience' of individuals diagnosed with chronic diseases (Paterson, 2001; Paterson, Thorne, & Russell, 2002; Thorne, Paterson, & Russell, 2003). Paterson (2001) conducted a meta-analysis of 292 qualitative studies of persons living with chronic illness. The resulting *Shifting Perspectives Model of Chronic Illness* (see Figure 7) illustrates

> . . . an on-going, continually shifting process in which people experience a complex dialectic between themselves and their 'world.' The experience of chronic illness is depicted as a series of ever changing perspectives about the disease that enables people to make sense of their experience. (p. 23)

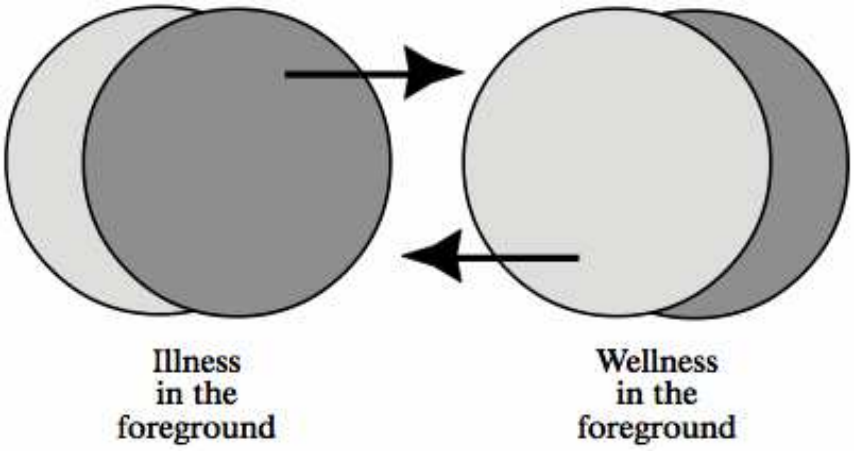

Figure 7. The Shifting Perspectives Model of Chronic Illness. From "The Shifting Perspectives Model of Chronic Illness," By B. L. Paterson, 2001, *Journal of Nursing Scholarship, 33*, 21-26. Copyright 2004 by John Wiley and Sons. Reprinted with permission (see Appendix N).

The *Shifting Perspectives Model of Chronic Illness* presents a process whereby persons with chronic disease move between an awareness of their wellness in the foreground, with other quality of life factors taking precedence, or illness in the foreground, with the traits of the illness predominating and the belief that the illness is a destructive factor to self and relationships with others. Despite the potentially adaptive purposes of illness in the foreground (i.e., motivating the individual to learn and come to terms with the disease, develop efficacy in tasks associated with the day-to-day management of the disease, and request necessary support and assistance from significant others), individuals experiencing illness in the foreground tend to be consumed by the illness experience and have difficulty moving their focus to non-illness related aspects of their lives. Individuals experiencing wellness in the foreground view the chronic illness as an opportunity for meaningful changes in their relationships with their physical and social environments. In contrast, individuals experiencing wellness in the foreground find their identities in the core traits of themselves as opposed to finding their identities in their bodies and the features of their illness.

The importance of the patient experience in developing effective type 2 diabetes regimens has been a significant focus in the diabetes literature (Hunt, Pugh, et al., 1998; Karas-Montez & Karner, 2005; Rayman & Ellison, 2000). Noting the lack of adherence to the recommended type 2 diabetes regimen despite the presence of formal education programs and informal training conducted by health care professionals, Rayman and Ellison (2000) conducted a review of the literature in order to determine the essential factors for maintaining self-management from the patient's perspective. The primary

theme that emerged was that patient behavior, even when it diverged from the recommended treatment plan, was logical and rational because it reflected the psychosocial and cultural context of their lives. Due to the importance of culture and lifestyle in the day-to-day diabetes related decision making, the authors recommended that diabetes educators alter their interpretation of patient behaviors from 'noncompliant' to behaviors that are consistent with patients' values, beliefs, and life goals. As a consequence, the health care provider's goal becomes partnering in self-management decision-making rather than attempting to control self-management behaviors with strict regimen prescriptions.

Ingadottir and Halldorsdottir (2008) conducted a qualitative study of persons with type 2 diabetes in order to explore their self-management experiences and reported findings consistent to those found by Rayman and Ellison (2000). Participant responses revealed four themes to be essential to the self-management process: (a) the pursuit of knowledge, understanding, and experience, (b) fighting fear in the search for safety (i.e., fear of hypoglycemia, fear of diabetic related complications, fear of the truth of the diagnosis), (c) dealing with desires (i.e., the desire to do right, the desire to be normal, and temptations), and (d) issues of autonomy. According to the authors, "[t]here has been a call for a broader exploration of the subject, with patients as equal participants, re-evaluating the meaning of adherence from the individual as well as social perspective" (p. 606). The authors concluded that one explanation for poor treatment outcomes in the diabetes population is the need for the appreciation of self-knowledge and approaches

and interventions that treat patients as equal participants in the creation of wellness plans that reflect their individual lifestyles and definitions of health.

Although the models and approaches discussed in this section highlight different aspects of the chronic illness management process, they are similar in their description of the course of chronic illness management as a "dynamic, continuously evolving, long-term, complex, and somewhat unpredictable process" (Livneh, 200l, p. 151). For the current study, the most significant developments in the type 2 diabetes self-management literature center on honoring the experiential aspects of the disease. Key experiential self-management concepts discussed in this section are: (a) the recognition of the importance of approaching self-management challenges from the individual's perspective as opposed to the health care professional's perspective, (b) the recognition that the experience of self-management is not static; it is a "shifting" process that changes as the individual's perspective changes, and (c) the recognition that self-management is an adaptive and developmental process that changes according to the individual's personal, relational, and treatment considerations.

The experiential models reviewed here indicate the relevance of problem solving skills to meet daily self-care challenges and the importance of incorporating self-management behaviors into an existing lifestyle and social context. These aspects of self-management are enhanced by a process of body listening, developing knowledge of self, and the opportunity to self-regulate behaviors that are consistent with effective management. The mindfulness concept presents opportunities to address the numerous

emotional and behavioral challenges facing those who are diagnosed with type 2 diabetes.

Chapter Summary

A review of the literature on type 2 diabetes and its related conditions indicates that it is a disease of epidemic proportion. The approximately 25.8 million Americans and 285 million people worldwide who are affected are at risk of developing numerous debilitating conditions and die at twice the rate of those without diabetes. A recent American Diabetes Association (ADA) report estimated that the total costs of diabetes related health care rose from $174 billion in 2007 to $245 billion in 2012 – figures that underscore the significant social costs associated with the disease (ADA, 2013). The considerable personal and social tolls of diabetes make effective self-management imperative.

The literature on the use of mindfulness in type 2 diabetes populations indicates that mindfulness interventions show promise as complementary therapies for improving emotion regulation, stress management, long-term glucose levels, and self-management capacity. However, to date the literature is incomplete in drawing an explicit connection between mindfulness and diabetes self-management. It also is unknown if key socio-demographic variables add appreciably to explaining diabetes self-management. In addition, for many people diabetes self-management is complicated by diabetes-related distress (DRD), a condition caused by the cumulative burden of attending to self-care demands and relational challenges.

Because of the self-regulation properties of mindfulness, mindfulness-based approaches and interventions hold promise for encouraging the self-management capacity of individuals with type 2 diabetes. Due to the prevalence of mood-related conditions, DRD is a potential mediator in the relationship between mindfulness and diabetes self-management. If it is true that those who demonstrate greater degrees of mindfulness also experience less DRD, mindfulness presents a promising pathway for encouraging more effective type 2 diabetes self-management. Greater understanding of the mechanisms to better diabetes self-management, with mindfulness as the theoretical foundation, may pave the way for improved prevention and intervention efforts among health care and mental health professionals.

In Chapter III the research questions and hypotheses for the main study will be presented followed by the proposed procedures and analyses, description of the study participants, instrumentation, and results of the pilot study. Finally, implications for the full study, based on the pilot study results, are presented.

CHAPTER III

METHODOLOGY

In Chapter II, a review of the literature on socio-demographic variables implicated in type 2 diabetes, mindfulness, negative mood states with particular attention to diabetes-related distress (DRD), and the theories and models relevant to type 2 diabetes self-management was presented. In this chapter, the research questions and hypotheses for the main study are presented followed by a description of study participants, instrumentation, and results of the pilot study. The chapter concludes with a discussion of the proposed procedures, data analyses, and implications for the full study.

Research Questions and Hypotheses

The current study was designed to test the relationships between the mindfulness construct, the mindfulness components of awareness and acceptance, DRD, and the self-management behaviors of adults with type 2 diabetes. In order to test these relationships the following specific research questions and hypotheses were developed.

Research Question 1: What are the relationships among mindfulness, awareness, acceptance, diabetes-related distress, and self-management behaviors among adults with type 2 diabetes?

Research Question 1a: What is the relationship between mindfulness and self-management behaviors among adults with type 2 diabetes?

Hypothesis 1a: There will be a significant positive correlation between mindfulness and self-management behaviors.

Research Question 1b: What is the relationship between awareness and self-management behaviors among adults with type 2 diabetes?

Hypothesis 1b: There will be a significant positive correlation between awareness and self-management behaviors.

Research Question 1c: What is the relationship between acceptance and self-management behaviors among adults with type 2 diabetes?

Hypothesis 1c: There will be a significant positive correlation between acceptance and self-management behaviors.

Research Question 1d: What is the relationship between diabetes-related distress (DRD) and self-management behaviors among adults with type 2 diabetes?

Hypothesis 1d: There will be a significant negative correlation between diabetes-related distress and self-management behaviors.

Research Question 2: Do mindfulness, awareness, acceptance, and diabetes-related distress explain a significant amount of variance in diabetes self-management among adults with type 2 diabetes?

Hypothesis 2: Mindfulness, awareness and acceptance, and diabetes-related distress will explain a significant portion of the variance in diabetes self-management.

Research Question 3: How does diabetes-related distress mediate the relationships between mindfulness and diabetes self-management, awareness and diabetes self-management, and acceptance and diabetes self-management?

Hypothesis 3: Diabetes-related distress will mediate the relationships between mindfulness and diabetes self-management, awareness and diabetes self-management, and acceptance and diabetes self-management.

Research Question 4: After controlling for mindfulness, awareness and acceptance, and diabetes-related distress, how do socio-demographics such as age, gender, income level, access to healthy foods, and physical exercise further predict type 2 diabetes self-management?

Hypothesis 4: After controlling for mindfulness, awareness, acceptance and diabetes- related distress, the socio-demographic variables will explain a significant amount of variance in diabetes self-management. In particular, among all socio-demographic variables, income level will make the strongest contribution to the regression model.

Participants

Participants will be men and women aged 45 to 65 years who were diagnosed with diabetes by a physician based on an Hba1c test score ≥ 6.5 % (American Diabetes Association Standards for Care; ADA, 2012) at least one year prior to participation in the study. The age range for study eligibility was determined in light of the mid-forties as the average age of diagnosis and after consultation with the staff of the Cone Health Nutrition and Diabetes Management Center. The staff suggested that a wide age range would be helpful for participant recruitment. A power analysis, using G*Power software, based on a 9 variable multiple regression with a moderate effect size of 0.25 and power of 0.8 indicated that 100 participants will be needed for this study. However, due to the

possibility of missing or otherwise non-useable data, the researcher will attempt to recruit 150 participants.

Instrumentation

Participants will complete a study packet containing five instruments with a total of 108 items: The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), The Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008), The Diabetes Distress Scale (DDS17; Polonsky et al., 2005), The Self-Care Inventory-revised (SCI-R; Weinger et al., 2005) (Appendices G-J), and a brief demographic questionnaire developed by the researcher of this study (Appendix L). The order of the first four instruments will be randomized in order to minimize ordering effects such as the possibility of participant fatigue. The demographic questionnaire will be included as the final assessment in each packet. Permission to use the FFMQ was provided by Dr. Ruth Baer, permission to use the PHLMS was provided by Dr. Lee Ann Cardaciotto, permission to use the DDS17 was provided by Dr. Lawrence Fisher, and permission to use the SCI-R was provided by Dr. Annette M. La Greca. Documentation of permission to use the scales is provided in Appendix M.

Mindfulness: The Five Facet Mindfulness Questionnaire (FFMQ)

Mindfulness will be measured in the current study with the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006). The FFMQ was designed in response to the need for a psychometrically sound instrument that clarified the multifaceted nature of mindfulness (Baer et al., 2006). The FFMQ is composed of 39 items and five subscales: *Observing* (8 items related to noticing internal and external

experiences), *Describing* (8 items related to labeling the experiences into words), *Acting with Awareness* (7 items related to attending to experiences that arise in the moment), *Nonjudging* (8 items related to taking an accepting, non-evaluative position toward thoughts and feelings, and *Nonreactivity* (8 items related to allowing thoughts and feelings to come and go). The instrument contains items such as, *I notice how food and drinks affect my thoughts, body sensations, and emotions* (Observing), *I can easily put my beliefs, opinions, and expectations into words* (Describing), *It seems I am running on "automatic" without much awareness of what I am doing* (Acting with Awareness), *I think some of my emotions are bad or inappropriate and I shouldn't feel them* (Nonjudging), and *In difficult situations I can pause without immediately reacting* (Nonreactivity). The items are rated on a 5-point Likert-type scale ranging from 1 (*never or very rarely true)* to 5 (*very often or always true*). The FFMQ produces a total mindfulness score, with higher scores indicated a greater degree of mindfulness. Each subscale of the FFMQ also produces a subscale score; however, for purposes of this study only the total mindfulness score will be used for data analysis purposes.

During the development of the FFMQ (Baer et al., 2006), 613 students were asked to complete a questionnaire packet containing the available mindfulness measures at the time (the Mindful Attention Awareness Scale [MAAS; W. B. Brown & Ryan, 2003], the Freiburg Mindfulness Inventory [FMI; Buchheld, Grossman, & Walach, 2001], the Kentucky Inventory of Mindfulness Skills [KIMS; Baer, Smith, & Allen, 2004], the Cognitive and Affective Mindfulness Scale [CAMS; Feldman, Hayes, Kumar, & Greeson, 2004], and the Mindfulness Questionnaire [MQ; Chadwick, Hember, Mead,

Lilley, & Dagnan, 2005] in order to determine whether the items of each mindfulness instrument were internally consistent and whether the instruments could discriminate between participants with meditation experience and those without meditation experience. Comparisons between the FFMQ and other mindfulness instruments indicated good internal consistency (MAAS = 0.86, FMI = 0.84, KIMS = 0.87, CAMS = 0.81, and MQ = 0.85). Correlations between the instruments on mindfulness experience also indicated satisfactory convergent validity. The participants were also asked to complete a battery of instruments in order to determine convergent and discriminant validity of the of the total scale and subscales: Brief Symptom Inventory [BSI] (Derogatis, 1993), NEO-Five Factor Inventory [NEO-FFI] (Costa & McRae, 1992), Trait Meta-Mood Scale [TMMS] (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), White Bear Suppression Inventory [WBSI] (Wegner & Zanakos, 1994), Difficulties in Emotion Regulation Scale [DERS] (Gratz & Roemer, 2004), Toronto Alexithymia Scale [TAS-20] (Bagby, Taylor, & Parker, 1994), Scale of Dissociative Activities [SODAS] (Mayer & Farmer, 2003), Acceptance and Action Questionnaire [AAQ] (Hayes et al., 2004), Cognitive Failures Questionnaire [CFQ] (Broadbent, Cooper, Fitzgerald, & Parks, 1982), and the Self-Compassion Scale [SCS] (Neff, 2003a). All of the correlations between the FFMQ and instruments measuring similar and dissimilar constructs were in the hypothesized directions, and most were statistically significant.

An exploratory factor analysis was conducted by combining the mindfulness instrument responses from the 613 participants (Baer et al., 2006). A scree plot suggested the presence of five factors, and a second factor analysis was conducted

specifying five factors indicating a five-factor solution accounting for 33% of the variance after factor extraction. The items with the highest loadings on the five factors were selected for inclusion in the FFMQ subscales, and alpha coefficients were computed for each (observing = 0.83, describing = 0.91, nonjudging = 0.87, nonreactivity = 0.75, and acting with awareness = 0.87). Correlations between the subscales ranged between 0.15–0.34, with the exception of observing and judging which correlated at -0.07. The authors conducted a second factor analysis to determine whether the facets existed as independent constructs or were part of an overarching mindfulness construct. The second factor analysis indicated that four of the subscales (describing, nonjudging, nonreactivity, and acting with awareness) were consistent with an overarching mindfulness construct; however, observing was not encompassed by the single mindfulness construct model. The authors explained that the observing subscale may not have been captured by the single mindfulness construct model because the three observing items may focus on skill sets too distinct to align closely with the overarching mindfulness construct.

Baer et al. (2008) tested the construct validity of the FFMQ on samples of meditators and non-meditators with various levels of meditation experience. Participants were divided into four meditation experience groups (non-meditating community adults, non-meditating college students, meditators [45% meditated regularly for more than 10 years], and mental health professionals). In order to determine whether the FFMQ facets were consistent with psychological symptoms and health, participants were given instruments designed to measure psychological distress (the Brief Symptom Inventory [BSI; Derogatis, 1992]) and psychological well-being (Psychological Well-Being [PWB;

Ryff 1989]). After controlling for age, education, and mental health work background, four of the five FFMQ subscales were positively associated with meditation experience (Pearson correlations were observing = 0.35, describing = 0.14, nonjudging = 0.22, nonreactivity = 0.31, and acting with awareness = 0.04 (ns), $p < .01$). As expected, most of the correlations between the FFMQ facets and psychological symptoms were negative. However, the correlation between the observing facet and psychological symptoms was positive in the student sample and insignificant in the community and mental health professional samples. The authors explained that the greater capacity to observe internal and external stimuli in meditators is associated with fewer psychological symptoms. As expected, most of the correlations between mindfulness facets and psychological well-being were positive. The associations between psychological well-being and observing were only significant in the meditating sample, again indicating associations between observing and psychological health in experienced meditators that were not present in non-meditators.

The FFMQ has demonstrated reliability across time. Carmody and Baer (2008) conducted a study to determine whether participation in a mindfulness-based stress reduction program (MBSR) would result in significant improvements in levels of mindfulness, reduction of psychological symptoms and significant improvements in well-being. Paired sample *t*-tests of pre-post MBSR intervention scores on all of the FFMQ facets indicated significant improvements. A mediation model using multiple linear regression was tested to determine whether an increase in mindfulness accounted for the relationships between formal mindfulness practice and improvements in psychological

functioning. The findings suggested a mediation relationship between participation in an 8-week MBSR training, symptom reduction, and improved psychological well-being.

van Dam, Earleywine, and Danoff-Burg (2009) conducted a study that was designed to replicate the findings of Baer et al. (2008). Van Dam et al. (2009) found high levels of differential item functioning (DIF) in 18 of the 39 items. The DIF appeared to occur because of how the items were worded; meditators and non-meditators scored items differently depending on the positive or negative wording of the item. Van Dam et al. (2009) noted that a potential weakness of Baer et al. (2008) was that samples of meditators and non-meditators were not matched on age, gender or education. The authors suggested caution when using the FFMQ to compare degree of mindfulness across meditating and non-meditating samples and to draw inferences about the value of mindfulness-based interventions to increase mindfulness.

Responding to the validity concerns raised by Van Dam et al. (2009), Baer, Samuel, and Lykins (2011) recruited 115 meditators and 115 non-meditators who were demographically similar. Group differences based on age, years of education, sex, race, and mental health professional status were found to not be significant. Of potential significance to a study of mindfulness in a sample of persons with type 2 diabetes is the finding of Baer et al. (2011) that DIF was detected for items 1- *When I'm walking, I deliberately notice the sensations of my body moving*, 11- *I notice how foods and drinks affect my thoughts, bodily sensations, and emotions*, 13- *I am easily distracted*, and 35- *When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought or image was about*. Item 11 demonstrated significant DIF in the Van

Dam et al. (2009) and Baer et al. (2011) studies and had the largest effect size difference (d = .83). These results suggest that item 11 warrants further study. Further, item 11 may be particularly important to the study proposed here because food and drink intake are integral to type 2 diabetes self-management behaviors.

The studies reviewed here indicate that the FFMQ has acceptable validity and reliability for both the total mindfulness and subscale scores. In the proposed study, the FFMQ total mindfulness scale will be used in data analyses. Two components of mindfulness found to have implications for diabetes self-management, awareness and acceptance, are not directly measured by the FFMQ. In order to directly measure awareness and acceptance, the researcher will use the Philadelphia Mindfulness Scale, discussed in the next section.

Awareness and Acceptance: The Philadelphia Mindfulness Scale (PHLMS)

In their development of an operational definition of the mindfulness construct, Bishop et al. (2004) proposed a two-component model of mindfulness that encompassed (a) *awareness* and (b) *acceptance*. The literature has included awareness and acceptance as essential components of the mindfulness construct (Baer, 2003; Bishop et al., 2004; W. B. Brown & Ryan, 2003), characterizing awareness as the ability to bring attention to present moment experience, and acceptance as a nonjudgmental attitude toward experiences that allows internal and external stimuli to freely enter consciousness (Bishop, 2002; W. B. Brown & Ryan, 2007; Shapiro et al., 2006). Relevant to the current proposed study, heightened awareness and acceptance have been implicated in the diabetes literature as potentially significant contributors to effective type 2 diabetes self-

management (Gregg et al., 2007; Hernandez, 1991; Hernandez, Antone, et al., 1999; Ingadottir & Halldorsdottir, 2008).

Awareness and acceptance will be measured as distinct mindfulness components using the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto et al., 2008). The intention of the authors of the PHLMS was to develop an instrument that could be used with populations without meditation experience and would accurately distinguish between the acceptance and awareness components of the mindfulness construct. The PHLMS contains Awareness and Acceptance subscales and associated scores, and it does not produce a total mindfulness score. The PHLMS is composed of 20 items (10 items measuring acceptance, and 10 items measuring awareness). The Awareness subscale contains items such as, *I am aware of what thoughts are passing through my mind, I notice changes inside my body, like my heart beating faster or my muscles getting tense* and the, and the Acceptance subscale contains items such as, *There are aspects of myself that I don't want to think about, and If there is something I don't want to think about, I'll try many things to get it out of my mind*. The items are rated on a 5-point Likert-type scale ranging from 1 (*never)* to 5 (*very often*). The PHLMS produces Awareness and Acceptance subscale scores with higher scores indicating higher levels of each attribute.

Six studies were conducted to determine the validity and reliability of the PHLMS (Cardaciotto et al., 2008). The first study was designed to generate items that would capture and distinguish the acceptance and awareness concepts. The researchers defined awareness as "the continuous monitoring of ongoing internal and external stimuli" and acceptance as "a nonjudgmental stance toward one's experience". Clinical psychology

faculty and graduate students who were familiar with the mindfulness construct and its clinical applications generated one hundred and five (105) items (50 related to acceptance and 55 related to awareness). Six expert judges were asked to compare the generated items to the acceptance and awareness definitions and rate each item from 1-5 on a Likert-type scale on how well the item met the definitions. The *V* Index was used as a measure of the content validity of each item. Fifty-eight (58) items (29 acceptance and 29 awareness) were retained based their ability to adequately represent the acceptance and awareness concepts.

In the second study the instrument developers conducted a factor analysis of the 58 retained items. Two-hundred four (204) undergraduate students enrolled in a psychology course who were not receiving psychiatric or psychological treatment were given the 58 retained items and asked to rank them on a 5-point Likert-type scale according to how often they had experienced the described item in the previous week. A scree plot of the results indicated a two-factor model and a principal axis factoring restricting the factor analysis to a two factor solution was conducted. Twenty-five (25) items (14 awareness and 11 acceptance) with loadings ≥ 0.45 on each of the subscales were retained. Tests of the internal consistency of each subscale were conducted (Cronbach's $\alpha = 0.85$ for the awareness subscale, and Cronbach's $\alpha = 0.87$ for the acceptance subscale). Ten awareness and ten acceptance items were retained because the inter-item correlations were above the 0.15–0.50 parameter recommended by Clark and Watson (1995). The remaining subscales indicated strong reliability (Cronbach's $\alpha =$ 0.81 for the awareness subscale, and Cronbach's $\alpha = 0.85$ for the acceptance subscale).

In order to assess convergent and discriminant validity, the instrument developers submitted the PHLMS, the Mindfulness Attention Awareness Scale (MAAS; W. B. Brown & Ryan, 2003), the Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004), the Rumination-Reflection Questionnaire (RRQ; Trapnell & Campbell, 1999), the White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994), the Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996), the Beck Anxiety Inventory (BAI; Beck & Steer, 1993), and the Marlow-Crowne Social Desirability Scale (M-C SDS; Crowne & Marlowe, 1960) to 559 undergraduate psychology students who were not currently receiving psychiatric or psychological treatment. Higher scores on the PHLMS were associated with higher scores on the MAAS indicating good convergent validity. There was a significant positive correlation between the acceptance subscale of the PHLMS to the AAQ indicating good convergent validity, and a significant negative correlation to the RRQ indicating good discriminant validity. After controlling for social desirability, higher scores on the acceptance subscale were associated with less depression ($r = -0.33$, $p < .001$) and anxiety ($r = -0.32$, $p < 0.001$) symptoms, but no relationship was found between the awareness subscale and the psychopathology measures. These results provided further indication of the ability of the PHLMS to accurately measure the acceptance and awareness components of mindfulness without the influence of social bias.

Cardaciotto et al. (2008) conducted further tests of validity of the PHLMS on a sample of patients receiving services from an urban outpatient psychiatric clinic. No significant relationships were found between the awareness and acceptance subscales.

The internal consistency of the awareness subscale (Cronbach's $\alpha = 0.75$) and acceptance subscale (Cronbach's $\alpha = 0.75$) were adequate. Tests of convergent validity between the PHLMS and the AAQ found a moderate correlation between the awareness subscale and the mindful awareness/attention subscale of the AAQ. The acceptance subscale was found to negatively correlate with rumination and thought suppression. The acceptance and awareness subscales were not significantly related to social desirability. Further, after controlling for social desirability neither the awareness nor acceptance subscales were related to depression or anxiety.

Cardaciotto et al. (2008) conducted further validation analyses of an inpatient eating disorder sample and found no significant relationships between the awareness and acceptance subscales. As expected, the eating disorder sample indicated significantly lower levels of acceptance than was found in the authors' previous study of a nonclinical student sample. In a separate validation study of student counseling center volunteers, students received the PHLMS, the Beck Hopelessness Scale (BHI; Beck & Steer, 1988), the Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999), the Quality of Life Inventory (QOLI; Frisch, Corness, Villanueva, & Retzlaff, 1992), the Kentucky Mindfulness Scale (KIMS; Baer et al., 2004), and the Clinical Global Impression Scale (CGI; Zaider, Heimberg, Fresco, Schneier, & Liebowitz, 2003). There was a strong correlation between the awareness subscale and the observe subscale of the KIMS, and the acceptance subscale was strongly correlated with the accept and nonjudgment subscale of the KIMS. Also as expected, the awareness subscale did not correlate with the BDI-II, BAI, BHS, SHS, or the QOLI. Moderate negative correlations were found

between the acceptance subscale and depression, anxiety, and hopelessness and a moderate positive correlation between happiness and quality of life.

The studies reviewed here indicate that the PHLMS subscales are reliable and valid measures. The PHLMS subscales consistently performed in the expected directions in tests of convergent and discriminant validity indicating that the subscale items accurately and consistently measure two important components of mindfulness – awareness and acceptance.

Diabetes-related Distress: The Diabetes Distress Scale (DDS17)

Diabetes-related distress (DRD) will be measured using the Diabetes Distress Scale (DDS17; Polonsky et al., 2005). Several instruments have been used to measure the emotional distress associated with type 2 diabetes (Measure of Psychological Adjustment to Diabetes (ATT39); Dunn, Smartt, Beeney, & Turtle, 1986; Questionnaire on Stress in Patients with Diabetes-Revised (QSD-R); Herschbach et al., 1997; Problem Areas in Diabetes Scale (PAID); Polonsky et al., 1995). Polonsky et al. (2005) developed the DDS17 in response to the limitations of other instruments and the need for a valid and reliable measure that captured the nature of diabetes-related distress in a manner that was brief yet comprehensive, contained clear and concise items, and contained subscales to assist clinicians and researchers in identifying specific areas of distress. The DDS17 contains 17 items and 4 subscales (emotional burden, regimen-related distress, physician-related distress, and interpersonal distress). The subscales contain items such as, *Feeling angry, scared and/or depressed when I think about living with diabetes* (emotional burden), *Feeling that diabetes is taking up too much of my mental and physical energy*

every day (regimen-related distress), *Feeling that my doctor doesn't know enough about diabetes and diabetes care* (physician-related distress), and *Feeling that friends or family don't appreciate how difficult living with diabetes can be* (interpersonal distress). A Flesch-Kincaid assessment indicated a grade reading level of 7.3.

Items are scored on a 6 point Likert-type scale that queries users to rate their levels of distress from 1(*not a problem)* to 6 (*a very serious problem),* with higher scores for each subscale indicating a greater degree of distress. A total score is calculated by adding the scores of each item and dividing by the total number of items. The subscale scores are calculated by adding the scores of the items on each scale and dividing by the total number of subscale items. A mean score of < 2.0 indicates little or no distress, 2.0 – 2.9 indicates moderate distress, and ≥ 3.0 indicates high distress (L. Fisher, Hessler, Polonsky, & Mullan, 2012).

In the development of the DDS17, a panel of experts including patients, diabetes nurse specialists, dieticians, diabetes health educators, and psychologists were asked to review the combined items of the Measure of Psychological Adjustment to Diabetes (ATT39), Questionnaire on Stress in Patients with Diabetes-Revised (QSD-R), and the Problem Areas in Diabetes scale (PAID; Polonsky et al., 2005). The 50 combined items were narrowed to 28 items based on vagueness, ease of comprehension, and repetitiveness. The remaining 28 items were divided into four domains relevant to diabetes: emotional burden, physician-related distress, regimen-related distress, and diabetes-related interpersonal distress.

The 28-item scale was piloted at four sites that conducted type 2 diabetes research and/or an intervention. The combined sample was 52.7% non-Hispanic White, 19.6% Asian and Pacific Islandic, 13.2% African American, and 7% Hispanic. The 4 study sites also provided significant variability in terms of patients seeking primary and diabetes specialized care. An exploratory factor analysis scree plot indicated four to five viable factors, and a data analysis of each pilot study site supported the presence of 4 factors. A confirmatory factor analysis on the four extracted factors supported the original content domains – emotional burden, physician-related distress, regimen- related distress, and interpersonal distress. Items with high factor loadings that reflected the major content areas were retained. Cronbach's α (total = 0.93; emotional burden = 0.88; physician-related distress = 0.88; regimen-distress = 0.90; interpersonal distress = 0.88) indicated adequate internal reliability for a 17 item total scale and the four subscales. In order to assess convergent validity of the subscales, participants were given diabetes self-management (Summary of Diabetes Self-Care Activities Scale [SDSCA]), depression symptom (i.e., Center for Epidemiological Studies Depression Scale [CESD]), and Hba1c assessments. Pearson correlation coefficients were used to compare the DDS17 total scale and subscales to the CESD, SDSCA, and Hba1c scores. The DDS17 total scores were positively associated with depressive symptomology ($r = 0.56$) and exercise behavior ($r = 0.30$) and meal planning behavior ($r = 0.13$) subscales of the SDSCA, but unrelated to Hba1c levels ($r = 0.01$). All four subscales were positively associated with depressive symptomology ($r > 0.34$). The emotional behavior and regimen-distress related distress subscales were correlated to the poor exercise behavior ($r = 0.12$ and $r =$

0.16 respectively) and poor meal planning (r = 0.21 and r = .43 respectively) subscales of the SDSCA.

Graue et al. (2012) conducted a study to test the reliability and validity of the Norwegian DDS17. The items were translated, and an exploratory and confirmatory factor analysis indicated a total score and four-factor model consistent with the original instrument subscales. Tests for internal consistency indicated adequate reliability (Cronbach's α = 0.81 – 0.87), and test-retest reliability was high. The DDS17 was found to discriminate well between people with and without foot problems and neuropathy. Inconsistent with the validity findings of the original scale, the Norwegian DDS17 scores were positively associated with Hba1c levels (r = 0.29).

The studies reviewed here indicate that the DDS17 has strong reliability and validity. Because the research questions were designed to determine to what extent diabetes-related distress as an overarching construct explains diabetes self-management, only the total score of the DDS17 will be used for data analysis purposes. That is, whereas the individual subscale scores of the DDS17 may have clinical and potential research significance, the research questions of the current study are directed at determining the relationships between total mindfulness and its related aspects, awareness and acceptance, and total diabetes-related distress, not the influence of the specific diabetes-related distress subscale factors (emotional burden, physician-related distress, regiment-related distress, and interpersonal distress) to type 2 diabetes self-management.

Type 2 Diabetes Self-Management: The Self-Care Inventory-Revised (SCI-R)

Type 2 diabetes self-management will be measured using the Self-Care Inventory-revised (SCI-R; Weinger et al., 2005). Several instruments have been designed to measure constructs relevant to the treatment and self-management of persons with diabetes and other chronic diseases (See Derogatis, 1986; Mishali, Vaknin, Omer, & Heymann, 2007; Polonsky et al., 2005; Toobert et al., 2000). The Self-Care Inventory-revised (SCI-R; Weinger et al., 2005) was developed to provide clinicians and researchers with an indicator of how well patients are following their self-care recommendations with good psychometric properties. According to the authors, the SCI-R is not based on an ideal self-management regimen, but rather reflects the individualized nature of diabetes care. Specifically, the SCI-R measures individuals' perceptions of how well they have adhered to treatment recommendations by asking them to indicate what they actually do, not what they have been advised to do, in terms of their self-care in the last 1-2 months. The SCI-R contains 15 items that are rated on a 5-point Likert-type scale that asks users to rate their participation in self-care behaviors from 1 (*Never)* to 5 (*Always),* with higher scores indicating a greater engagement in self-care behaviors. Items include, *#1 (Check blood glucose with monitor), #5 (Take the correct dose of diabetes pills or insulin), and #6 (Eat the correct food portions).* The SCI-R provides a total score, and does not provide subscale scores. Higher scores indicate a greater degree of diabetes self-management. For purposes of this study, the total score of the SCI-R will be used for data analyses.

Weinger et al. (2005) evaluated the internal consistency of the SCI-R with tests of convergent and concurrent validity. In order to determine concurrent and convergent validity of the SCI-R, 90 adults with type 2 diabetes completed the SCI-R, the Summary of Diabetes Self-Care Activities Measure (SDSCA; Toobert et al., 2000) the Benefits/Barriers scale (Bradley, Brewin, Gamsu, & Moses, 1984) and the Problem Areas in Diabetes scale (PAID; Welch, Jacobson, & Polonsky, 1997). In order to compare the SCI-R and SDSCA the subscales were standardized by grouping items based on diet, exercise, blood glucose monitoring, and medication administration. The correlations between the standardized subscales of the SCI-R and the SDSCA on blood glucose monitoring ($r = 0.68$, $p < 0.0001$), diet ($r = 0.25$, $P < 0.02$), exercise ($r = 0.60$, $p < 0.0001$), and medication administration ($r = .38$, $p < 0.0003$) indicated moderate to high correlation. As expected the SCI-R was negatively correlated with the PAID ($r = -0.37$) and the Barriers subscale ($r = -0.30$); no correlation was found with the Benefits subscale.

A second study was conducted by Weinger et al. (2005) to further examine the convergent validity of the SCI-R and to examine the scale's factor structure. This study included the pooled data from three ongoing studies of 407 adults with diabetes. The participants completed the SCI-R, the Problem Areas in Diabetes Scale (PAID; Welch et al., 1997), the Rosenberg Self-Esteem scale (RSE; Rosenberg, 1979, Confidence in Diabetes Scale (CIDS; Van der Ven et al., 2003,) and the Symptoms Checklist-90 (SCL-90; Derogatis & Cleary, 1977). The internal consistencies of items in the total sample (Cronbach's $\alpha = 0.85$) and for the type 2 diabetics included in the sample (Cronbach's $\alpha = 0.85$) were high. The expected positive correlations between the SCI-R and the RSE

($r = 0.25$, $p < 0.0001$), and the CIDS ($r = 0.47$, $p < 0.0001$), and a negative correlation between the SCI-R and diabetes related emotional distress ($r = -0.36$, $p < 0.0001$), anxiety ($r = -0.24$, $p < 0.0001$), and depression ($r = -0.22$, $p < 0.0001$) were found. The SCI-R indicated good ability to discriminate between participants with good glucose control (Hba1c ≤ 7.0) and poor glucose control (Hba1c ≥ 9.0), $t = 4.45$, $p < 0.0001$). An internal structure analysis indicated a large general factor for type 2 diabetes participants. This was supported by follow-up analyses of principal component eigenvalues, also indicating one factor.

A third study was conducted by Weinger et al. (2005) to further examine the responsiveness of the SCI-R to changes in Hba1c scores of individuals with type 1 diabetes who completed a diabetes education intervention. Fifty-seven (57) adults with type 1 diabetes who received diabetes related psycho-educational intervention completed the SCI-R for responsiveness analysis and had Hba1c levels measured at baseline and two months following the intervention. As expected, the mean SCI-R scores were higher ($t = 5.91$, $p = 0.001$) at the two month post intervention point (64.4 ± 10.8) than they were at baseline (57.9 ± 10.6). Further analysis of change in participant Hba1c scores indicated an effect size for the total group was 0.62 compared to a Guyatt's responsiveness statistic for improved participants of 0.85 indicating good responsiveness of the SCI-R to change in participants. Measures of a scale's responsiveness to an intervention are indicators of the scales' ability to measure the intended change in behavior. The fact that the SCI-R was found to have good responsiveness to an intervention provides additional support for the validity of the instrument.

The authors noted that delimitations of the SCI-R are its inclusion of only one item referencing physical exercise activity and the exclusion of items related to checking feet regularly and checking for patterns in glucose levels. Nonetheless, the studies reviewed here indicate that the SCI-R has good validity and reliability.

Demographic Questionnaire

The author constructed a demographic questionnaire in order to obtain descriptive information regarding the participants' age, gender, race, ethnicity, and socio-economic status, experience with mindfulness activities, access to healthful food options, and access to outlets for physical activity. Of particular interest to the researcher was socio-economic status as a potential indicator of participants' ability to access healthful food options and outlets for physical activity. The author was also interested in participant experience with mindfulness related activities as a developed mindfulness practice and prior participation in mindfulness-based interventions may positively influence participant levels of mindfulness, awareness, and acceptance scores. These variables, and their relation to type 2 diabetes, are thoroughly reviewed in Chapter II. The demographic questionnaire can be found in Appendix L.

Procedures

Permission to collect data will be requested from the directors of the Cone Health Nutrition and Diabetes Management Center and Cone Health Family Medicine. After receiving permission to collect data from the medical centers, approval will be sought from the University of North Carolina (UNCG) Institutional Review Board. Approval to

collect data from Cone Health will be granted by mutual agreement between Cone Health and UNCG IRB.

Participant recruitment flyers will be posted at both health centers (Appendix E). A staff member of each center will be asked to identify eligible patients from their databases of patients meeting the study inclusion criteria. Eligible patients who are scheduled for an appointment or diabetes education group during the study period will be flagged. In order to protect the confidentiality of eligible participants, the health center staff responsible for selecting potential study participants will be asked to sign a confidentiality agreement. The researcher will offer the survey packets and two informed consent forms to study eligible patients before their appointments with the health center staff. Eligible patients who consent to participate will be invited to begin the packet while they are waiting or following their appointments.

The student researcher will review the Cover Letter/Introduction to the Study (Appendix C) that provides a brief description of the study, approximate time to complete the packet, a description of the incentive to participate (i.e., a five dollar bill), instructions for completing the instruments, and an invitation to contact the researcher with questions about the study. Next, the student researcher will review the Informed Consent Form (Appendix D) with directions for participants to retain one copy for their records and return one signed or unsigned copies (if they refuse to participate) to the student researcher. The informed consent will provide an approximate time for participation, a brief description of the study, description of the potential risks and benefits of participating in the study, an invitation to contact the researcher with questions about the

study, an explanation that participation in the study is completely voluntary and can be withdrawn at any time without penalty. To further protect participant confidentiality, signed informed consent forms will be kept separate from the questionnaire packets.

The following instruments will be included in the packet: The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), The Philadelphia Mindfulness Scale (PHLMS; Cardaciotto et al., 2008), The Diabetes Distress Scale (DDS17; Polonsky et al., 2005), and The Self-Care Inventory-revised (SCI-R**;** Weinger et al., 2005), and a demographic questionnaire developed by the researcher. After the packets are completed, the researcher will collect the packets in the reception area. The completed sealed packets will be placed into a collection box provided by the researcher. The researcher will count the completed packets during each collection period. The completed questionnaire packets will be kept in a locked file cabinet in the principal investigator's office during the data collection period.

Data Analyses

Descriptive statistics will be calculated from data collected from the demographic questionnaire. To address research questions 1 and 1a-1d Pearson product moment correlations will be used to determine correlations among the key variables in the study. Bivariate correlations between these variables will be calculated and compared. Multicollinearity will be checked for the multiple regression analyses. In order to evaluate research question 2, multiple regression analyses will be used. In this analysis, total mindfulness, awareness, acceptance, and diabetes-related distress (DRD) will serve as predictor variables and diabetes self-management will serve as the dependent variable.

To address research question 3, multiple regression analyses with Sobel tests will be used. Research question 4 will be answered using hierarchical multiple regression. In this analysis, total mindfulness, awareness, acceptance, and DRD will be entered as the first "block" of predictor variables, and the socio-demographic variables will be entered as a second "block." Diabetes self-management will again serve as the dependent variable. The research questions, independent variables, dependent variables, and proposed analyses are summarized in Table 1.

Table 1

Research Questions, Independent and Dependent Variables, and Proposed Data Analyses

Research Questions	**Independent Variables**	**Dependent Variables**	**Analyses**
1: What are the relationships among mindfulness, awareness, acceptance, and diabetes-related distress, and self-management behaviors among adults with type 2 diabetes?	Mindfulness Awareness Acceptance DRD	Diabetes Self-Management	Pearson Correlations
1a: What is the relationship between mindfulness and self-management behaviors among adults with type 2 diabetes?	Mindfulness	Diabetes Self-Management	Pearson Correlations
1b: What is the relationship between awareness and self-management behaviors among adults with type 2 diabetes?	Awareness	Diabetes Self-Management	Pearson Correlations
1c: What is the relationship between acceptance and self-management behaviors among adults with type 2 diabetes?	Acceptance	Diabetes Self-Management	Pearson Correlations

Table 1

(Cont.)

Research Questions	Independent Variables	Dependent Variables	Analyses
1d: What is the relationship between diabetes-related distress (DRD) and self-management behaviors among adults with type 2 diabetes?	DRD	Diabetes Self-Management	Pearson Correlations
2: Do mindfulness, awareness, acceptance, and diabetes-related distress explain a significant amount of variance in diabetes self-management among adults with type 2 diabetes?	Mindfulness Awareness Acceptance DRD	Diabetes Self-Management	Multiple Regression
3. How does diabetes-related distress mediate the relationships between mindfulness and diabetes self-management, awareness and diabetes self-management, and acceptance and diabetes self-management?	Mindfulness Awareness, Acceptance DRD (mediator)	Diabetes Self-Management	Multiple Regression with Sobel Tests
4. After controlling for mindfulness, awareness, acceptance, and diabetes-related distress, how do socio-demographics such as age, gender, income level, access to healthy foods, access to physical activity, further predict type 2 diabetes self-management?	Mindfulness, Awareness Acceptance, DRD, Age Gender, Income level, Access to Healthy Foods, Access to Physical Activity	Diabetes Self-Management	Multiple Regression

Pilot Study

Purpose and Research Questions

Data for the pilot study was collected from Cone Health Nutrition and Diabetes Management Center and Cone Health Family Medicine. The purpose of the pilot study

was to assess the clarity and feasibility of the procedures and instructions in preparation for the full study. The researcher sought feedback from the staff of the two medical centers regarding the study's administration and feasibility and from participants regarding the clarity and usability of the instrument packet. Although the sample size of the pilot study (n =10) did not allow statistically generalizable and meaningful conclusions, the data was used to assess the preliminary relationships among the variables. The pilot study was guided by the following research questions:

Research Question 1: Were participants able to complete the questionnaires as instructed (i.e., are the directions and questions clear and comprehensible)?

Research Question 2: What is the average length of time required to participate in the study?

Research Question 3: Do the instruments show adequate internal consistency?

Research Question 4: What are the bi-variate relationships between mindfulness, awareness, acceptance, diabetes-related distress, access to healthy foods, access to physical activity, and type 2 diabetes self-management?

Participants

Participants for the pilot study were recruited from the Cone Health Nutrition and Diabetes Management Center and Cone Health Family Medicine. Cone Health Internal Medicine declined to participate in the pilot study (and, hence, the full study) due to anticipated demands on staff resources and concern that the study would not provide a significant benefit to patient-participants. Participants for the pilot study (n = 10) were male and female patients aged 45 to 65 with a diagnosis of type 2 diabetes based on an

Hba1c test score of $\geq$ 6.5 % (ADA, 2012) for at least one year prior to participation in the study. The sample included 3 males and 7 females with a mean age of 55.2 years.

Instrumentation

The following instruments were included in the packet: The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), The Philadelphia Mindfulness Scale (PHLMS; Cardaciotto et al., 2008), The Diabetes Distress Scale (DDS; Polonsky et al., 2005), and The Self-Care Inventory-revised (SCI-R; Weinger et al., 2005). The packets also contained a demographic questionnaire that requested information regarding participant gender, age, race/ethnicity, date of diagnosis, income level, access to recommended foods, access to an outlet for physical activity, access to prescribed medications, and involvement in a mindfulness practice or intervention. Inter-item correlations for all scales and subscales indicated good internal reliability (addressing research question 3; Cronbach's $\propto$ = .758–.918). The alpha coefficients for each subscale are summarized in Table 2.

Table 2

Pilot Study Instrumentation, Alpha Coefficients, and Score Range (N = 10)

Instrument	Subscales	# of items	Alpha Score	Range
The Five Facet Mindfulness Questionnaire (FFMQ)[1]	Total Score	39	.758	39 – 195
The Philadelphia Mindfulness Scale (PHLMS)	Awareness	10	.894	10 – 50
	Acceptance	10	.871	10 – 50

Table 2

(Cont.)

Instrument	Subscales	# of items	Alpha Score	Range
Diabetes Distress Scale (DDS17)[1]	Total Score	17	.866	17 – 102
The Self-Care Inventory-Revised (SCI-R)	Total Score	7	.854	6 – 30

[1]The FFMQ and the DDS17 have multiple subscales; however, only the total scores were used in the pilot study.

Procedures

After receiving permission to collect data from the Cone Health Nutrition and Diabetes Management Center and Cone Health Family Medicine, approval was sought from the University of North Carolina (UNCG) Institutional Review Board (Appendix A). Approval to collect data from Cone Health was granted by mutual agreement between Cone Health and UNCG IRB.

The participant recruitment procedures differed slightly between the two collection sites. Participants were recruited from the Cone Health Nutrition and Diabetes Management Center during diabetes education groups and by staff referral. The researcher made a request for participation during the groups and to patients who were individually referred to the researcher based on the study's eligibility criteria. The Cone Health Family Medicine staff generated a list of scheduled patients who were diagnosed with type 2 diabetes. The researcher narrowed the list of patients with type 2 diabetes according to the study criteria. The researcher made a request for participation to the

study eligible patients in the examination room and invited them to complete the questionnaire while waiting for their doctor or immediately following the appointment. In order to protect the confidentiality of eligible participants, the health center staff responsible for selecting potential study participants were asked to sign a confidentiality agreement (Appendix B).

The researcher met briefly with each patient following their group or during their appointment and reviewed the Cover Letter/Introduction to the Study (Appendix C) that provided a brief description of the study, approximate time to complete the packet, a description of the incentive to participate (i.e., a five dollar bill), instructions for completing the instruments, and an invitation to contact the researcher with questions about the study. Two informed consent forms (Appendix D) that provided directions to retain one copy for their records and return one signed or unsigned copies (if refusing to participate) to the student researcher were given to each participant. The informed consent provided an approximate time for participation, a brief description of the study, description of the potential risks and benefits of participating in the study, an invitation to contact the researcher with questions about the study, and an explanation that participation in the study was completely voluntary and could be withdrawn at any time without penalty. After review and signature of the informed consent, a survey packet was given to each participant. The researcher collected the signed informed consents and sealed survey packets and placed the forms and sealed packets into separate collection envelopes.

Data Analyses

Following the data collection, data were entered into SPSS version 20 for Mac. Alpha coefficients were calculated for each scale in order to assess the internal consistency of the scale items (Table 2). Descriptive statistics were computed for the participant demographics in order to characterize the sample (Table 3). Mean scores were calculated for the FFMQ (total score), PHLMS (total score, awareness, and acceptance subscales), DDS17, and SCI-R (Table 4). Pearson product moment correlations were conducted to assess the relationships among mindfulness (mindfulness related subscales from the FFMQ), awareness, acceptance, diabetes-related distress, and diabetes-related self-care behaviors, as well as the socio-demographic variables access to foods and access to physical activity (Table 5). Item 5 of the SCI-R (*Take diabetes pills or insulin at the right time*) was omitted from the analyses because the question allows participants to not provide an answer if they do not take diabetes pills or insulin.

Results

Demographic characteristics. Survey respondents included 2 participants from Cone Health Nutrition and Diabetes Management Center and 8 participants from Cone Family Medicine. Four participants indicated participation in a mindfulness practice prior to participation in the study. Of the 4 participants who indicated having a mindfulness practice, 3 indicated that they incorporated mindfulness practice into their lives with meditation, “music and puzzles,” or “prayer time.” One participant indicated no prior mindfulness practice, but indicated prior participation in Acceptance and

Commitment Therapy (ACT). A summary of the descriptive statistics of the sample is provided in Table 3.

Table 3

Demographic Characteristics of Pilot Study Sample

Demographic Characteristic	*n*	%
Age		
45-50	2	20.0
51-55	3	30.0
56-60	4	40.0
61-65	3	30.0
Sex		
Male	3	30.0
Female	7	70.0
Collection Site		
Family Medicine	8	80.0
Diabetes Management	2	20.0
Mindfulness Practice/Intervention		
Yes	4	40.0
No	6	60.0
Access to Health Foods		
Daily	2	20.0
Moderate Daily	5	50.0
Minimal Daily	1	10.0
No Daily	2	20.0
Access to Physical Activity 1X/Week		
Yes	8	80.0
No	2	20.0
Household Income	1	10.0
$0-4,999	4	40.0
$10,000-39,999	3	30.0
$40,000-49,999	0	0.0
$50,000-59,999	1	10.0
$60,000-69,999	1	10.0

The household income for this sample ranged from $0-4,999 (*n* = 1), $10,000-19,999 (*n* = 4), $30,000-39,999 (*n* = 3), $40,000-49,999 (*n* = 0), $50,000-59,999 (*n* = 1), $60,000-69,999 (*n* = 1). Two participants indicated daily access to recommended foods, 5 indicated moderate access to recommended foods, 1 indicated minimal access to recommended foods, and 2 indicated no daily access to recommended foods. Eight participants responded that they had access to at least one outlet for physical activity (Yes), and two responded that they did not have access to at least one outlet for physical activity (No). Of the participants who use medications to manage their diabetes, 5 indicated daily access and 1 indicated moderate access to prescription medications.

Participant feedback. To address the first research question, the investigator administered the study packets and allowed participants to provide feedback on their experiences. Participants provided significant feedback to the student researcher. Several participants provided feedback regarding the need for assistance reading the packet due to the survey reading level or participant eyesight problems. One participant suggested that future participants be asked if they would like assistance reading the instrument during the process of obtaining consent to participate in the study. After reviewing the cover letter and informed consent, two participants indicated poor eyesight and glaucoma and requested assistance reading and completing the instrument packet. The student researcher found a suitable meeting space in the medical clinic to read and record the responses of these participants. Another participant arrived at her appointment with her mother/caregiver who volunteered to assist with completion of the instrument packet. The mother/caregiver indicated that her daughter had taken medication that made

reading and answering questions about past self-care behavior difficult. After completing the packet, the mother/caregiver stated to the student researcher that answering questions about emotions had been difficult for her daughter because of severe mental illness that requires daily psychotropic medications and makes questions about attitudes toward emotions and thoughts difficult to answer. Several participants did not answer the demographic form questions regarding participation in a mindfulness practice or intervention. Two participants apologized for not answering the mindfulness questions on the demographic form and explained that they had not answered because they did not know the meaning of the word mindfulness. Addressing research question 2, all of the participants completed the packets within 25-30 minutes.

Descriptives. A table of means and standard deviations, as well as a correlation matrix of the predictor variables was first calculated prior to addressing research question 4. The means and standard deviations for the predictor variables which include mindfulness, awareness, acceptance, and diabetes-related distress as well as the dependent variable, diabetes self-management, are displayed in Table 4. The mean self-management score for this sample was 3.03 (minimum = 2.00, maximum = 5.00). The mean total mindfulness score as measured by the FFMQ was 140.3 (minimum = 82.0, maximum = 179.0). The mean awareness score was 41.50 (minimum = 28.00, maximum = 50.00), and mean acceptance was 27.56 (minimum = 18.0, maximum = 50.0). Diabetes-related distress scores range from little or no distress (<2.0), moderate distress (2.0-2.9), and high distress ≥ 3.0. The mean diabetes-related distress score for this sample was 1.47 (minimum = 1.00, maximum = 2.64).

Table 4

Means and Standard Deviations for Instruments in the Pilot Study Sample

Instrument	*N*	*M*	Min	Max	*SD*
SCI-R	10	3.03	2.00	5.00	1.00
DDS17	10	1.47	1.00	2.64	.617
FFMQ	10	140.3	82.00	179.00	10.42
Awareness	10	41.50	28.00	50.00	7.95
Acceptance	9	27.56	18.00	50.00	10.42

Note: SCI-R = Self-Care Inventory – revised (SCI-R); DDS117 = Diabetes Distress Scale; FFMQ = The Five Facet Mindfulness Questionnaire (FFMQ); Awareness = subscale of the Philadelphia Mindfulness Scale (PHLMS); Acceptance = subscale of the Philadelphia Mindfulness Scale (PHLMS)

To address research question 4, Pearson Product Moment Correlations were calculated and displayed in Table 5. Several significant relationships were found from the FFMQ total score, the awareness and acceptance subscales of the PHLMS, the DDS17, and the SCI-R. As expected positive correlations were found between self-management and mindfulness (r = .405), as measured by the FFMQ), and between self-management and acceptance (r = .649, p < .05). A somewhat weaker correlation was found between self-management and the awareness (r = .417, p < .01) subscale of the PHLMS. A statistically significant negative correlation was found between diabetes-related distress and mindfulness (r = -.640, p < .05 as measured by the FFMQ), and negative correlations were found between diabetes-related distress and self-management (r = -.549), diabetes-related distress and the awareness subscale (r = -.621) of the PHLMS, and diabetes-related distress and the acceptance subscale of the PHLMS (r = -.370). These negative correlations were all in the expected directions.

Table 5

Correlation Matrix of FFMQ, Awareness, Acceptance, SCI-R, Access to Healthy Food, and Access to Physical Activity Scores in the Pilot Study

	FFMQ	Aware	Accept	DDS17	Access (f)	Access (p)	SCI-R
FFMQ	1						
Aware	.881**	1					
Accept	.578	.310	1				
DDS17	-.640*	-.621	-.370	1			
Access (f)	.668*	.672	.665	-.813**	1		
Access (p)	-.346	-.365	.051	-.082	.149	1	
SCI-R	.405	.417	.649*	-.549	.552	-.019	1

Note. * $p < .05$ (2-tailed); ** $p < .01$ (2-tailed). FFMQ = The Five Facet Mindfulness Questionnaire (FFMQ); Aware = Awareness (subscale of the Philadelphia Mindfulness Scale (PHLMS); Accept = Acceptance (subscale of the Philadelphia Mindfulness Scale (PHLMS); DDS117 = Diabetes Distress Scale; Access (f) = Access to Healthy Foods; Access (p) = Access to Physical Activity; SCI-R = Self-Care Inventory – revised (SCI-R).

A statistically significant correlation was found between access to healthy foods and mindfulness as measured by the FFMQ ($r = .668$; $p < .05$). Modest negative correlations were found between access to physical activity and mindfulness ($r = -.346$) and awareness ($r = -.365$). Although not statistically significant, these relationships were in the expected directions.

Discussion

The literature suggests the high prevalence of diabetes-related distress (Polonsky et al., 2005; Gonzalez et al., 2011); however, relatively low levels of diabetes-related distress were measured in the pilot sample. The diabetes-related distress instrument measures emotional burden, physician-related distress, regimen-related distress, and interpersonal distress. The low levels of diabetes-related distress found in this sample might be attributed to the high satisfaction with access to quality medical care and positive attitudes toward healthcare providers and low regimen-related distress as indicated by access to recommended foods and medications and access to at least one outlet for physical activity in eighty percent of the sample.

Several studies have suggested the relevance of mindfulness behaviors in the self-management of type 2 diabetes (Gregg et al., 2007; Hernandez, Antone, et al., 1999; Ingadottir & Halldorsdottir, 2008). The statistically significant correlation between self-management and acceptance provides further indication of the positive relationships between these constructs and support for further study. There is also support in the type 2 diabetes literature for further exploration of how diabetes-related distress affects the self-management of type 2 diabetes (Anderson et al., 2001; Ciechanowski et al., 2000;

Talbot & Nouwen, 2000). The negative correlation between diabetes-related distress and self-management suggests the relevance of further research to explore the strength of this association. Finally, the statistically significant negative correlation between diabetes-related distress and the mindfulness total score as measured by the FFMQ (r = -.640, p < .05) warrants further study of the associations between diabetes-related distress as a potential mediator between mindfulness and diabetes self-management.

Although the sample was not large enough to provide statistical significance in all measures, the initial correlations among the variables support further exploration with a larger sample. Some expected significant correlations were not found, such as relationship between the diabetes-related distress and the awareness subscale; this finding may also be due to the small sample size and will be investigated further in the full study.

There were several limitations of the pilot study that must be taken into account when interpreting results. The generalizability of the pilot results to a larger sample is limited due to the non-random, convenience sample. The small sample size precludes firm conclusions regarding the relationships among variables. The data were self-report which may have been negatively influenced by individual bias and subjective perception. The student researcher assisted two of the participants with completing the survey due to problems with eyesight; therefore, the student researcher's presence may have introduced interviewer bias and the participants' indication of socially desirable responses. Income level data could not be analyzed because the intervals were not divided into consistent intervals.

Implications for the Full Study

The pilot study provided useful information that will be applied to the design of the full study. For the full study, a convenience sample will be recruited from Cone Health Diabetes Management Center and Cone Health Family Medicine. In response to participant feedback, eligibility criteria will further exclude participants who are currently taking psychotropic medications that may affect emotional and cognitive awareness and the ability to answer questions related to awareness and acceptance of thoughts and emotions.

Recruiting participants for the pilot study was a time consuming and tenuous process. Further, the paper-pencil administration increased the potential for errors associated with manually entering data. For these reasons the student researcher is considering the use of an online format for the full study. If the online format is used, participants will be given the option of completing the survey on a computer or smart phone device provided by the student researcher or on their own smart phone devices. Participants will be informed that assistance reading the instrument packet will be provided if needed. If assistance is needed, the student researcher will be available to assist with the administration of the survey in the online format. In addition, the use of a headset for audio directions will be considered for the full study, so that additional assistance will be available.

Another potential implication for the full study based on the pilot results is the high correlation between FFMQ and awareness ($r = .881$, $p < .01$). Awareness is considered a component of mindfulness, and these results suggest that the FFMQ and

awareness subscale of the PHLMS may be measuring very similar constructs, raising concerns regarding multicollinearity. Although a larger sample may reduce the amount of multicollinearity among variables, all variables for the main study will be examined for multicollinearity and other data analysis assumptions. Appropriate steps and transformations will be taken if preliminary tests are not met.

The correlations between constructs produced results that were in the hypothesized directions and with adequate strength to support the use of the same instruments in the full study. However, the following revisions to the demographic questionnaire are proposed: (a) a brief definition of the mindfulness concept and behaviors that support the development of mindfulness be added in order to provide respondents with a context for answering questions regarding their prior participation in mindfulness related activities. The following description of mindfulness and practices that may help to develop mindfulness ability will be added the questionnaire*: Mindfulness involves your ability to notice sights, sounds, smells, tastes, and physical sensations and your ability to pay attention to your feelings and thoughts. Participation in certain activities such as meditation, Yoga, or Tai-Chi Chuan may help you to become more mindful of what is happening inside and outside of your body*; (b) the income intervals be revised to provide consistent increments between six levels ($0-9,999; $10,000-19,999; $20,000-29,999; $30,000-39,999; $40,000-49,999; $50,000 and above); (c) the responses for access to recommended foods be revised to provide definitions for daily, minimal, moderate and daily access (i.e., I do not have daily access [0 days a week]; I have minimal access [1 -3 days a week]; I have moderate daily access [4–6 days

a week]; I have total daily access [7 days a week]); (d) the access to physical activity question be revised to reflect the researcher's definition of physical activity (i.e., any physical activity such as walking, riding a bicycle, swimming, or gardening); and (e) the question about access to daily medications be removed from the demographic questionnaire. Although access to medication is frequently essential to effective type 2 diabetes self-management, medication use was not a significant focus of the literature reviewed for this study.

Modifications to the Full Study

The original methodology proposed to faculty included demographic questions that asked participants to rate their access to healthy foods and access to physical activity. The faculty recommended that the 'access' questions be restructured in order to more accurately assess actual participant behavior related to eating healthy food and physical activity rather than assessing access. After consulting with her doctoral committee chair, the researcher decided to remove the access to healthy foods and access to physical activity variables from the study. After re-examining the Review of the Literature, the student researcher and the doctoral committee chair determined that social support should be added to the study as a theoretical variable. An 11-item version of the Duke Social Support Index (DSSI) was added to the study as a measure of social support (Koenig et al., 1993). The 11-item Duke Social Support Index (DSSI) is a measure of subjective social support. The 11-item form was developed from the original 35- item measure to capture the essential components of social support with chronically ill older audiences who might not be able to tolerate the administration time of the original form. A factor

analysis of the 11 items composed of the multidimensional aspects of social support, subjective support and social interaction, indicated that the items loaded strongly on one factor, subjective social support. The authors suggested that the single factor model might be explained by the sample's (i.e., chronically ill elderly) findings of similarities between the two major social support dimensions, perceived quality of support and the actual quantity of social interaction (Koenig et al., 1993). The DSSI was determined to be a reliable and valid measure of social support for the current study.

In response to faculty feedback, the student researcher removed the income intervals on the demographic questionnaire and requested participants to provide a best estimate of their monthly income. Following the completion of the data collection, a histogram of the income data indicated considerable variance in responses such that there was a high potential for polluting the regression analysis; therefore, the income data were removed from the analysis.

Because of the removal of the access to healthy foods, access to physical exercise, and income variables and the addition of the social support variable, Research Question 4 and the corresponding hypothesis were revised to read:

Research Question 4: After controlling for mindfulness, awareness and acceptance, diabetes-related distress, and social support how do socio-demographics such as age and gender explain additional variance in type 2 diabetes self-management?

Hypothesis 4: After controlling for mindfulness, awareness, acceptance, diabetes-related distress, and social support, the socio-demographic variables age and gender will explain a significant amount of variance in diabetes self-management.

The original methodology that was proposed to faculty included the recruitment of patients from Cone Health Nutrition and Diabetes Management Center and Cone Health Family Medicine. The faculty recommended that the student researcher expand the pool of participants by investigating additional collection sites and the feasibility of online data collection and administration of the study. These changes were recommended due to the length and difficulty of recruitment in the pilot study and to expand the pool of eligible participants in order to expedite the volunteer recruitment and data entry process. In response to this feedback, the researcher added the internet panel, Researchmatch.org and prepared the survey for online administration through Qualtrics. The faculty suggested that participants taking psychotropic medications not be excluded from the study, except in the case of schizophrenia or other psychotic diagnosis that required anti-psychotic medications; the informed consent for the full study was revised accordingly.

Due to concerns about the clarity of the term mindfulness, the faculty recommended that the student researcher request an expert reviewer to evaluate the use of the term in the demographic questionnaire. The student researcher met with Dr. Bennett Ramsey a professor in the Department of Religious Studies at UNC-Greensboro. Dr. Ramsey recommended the removal of questions 11-15 on the pilot demographic questionnaire regarding participant mindfulness behaviors. Dr. Ramsey recommended that the following questions be added to the full study demographic questionnaire to help respondents differentiate between treatment and mindfulness behaviors: *What have you*

found to be most helpful in treating your type 2 diabetes?, and *Are there activities that you engage in that keep you aware and mindful of your type 2 diabetes*?.

After the start of data collection with Researchmatch.org, the Evans-Blount Community Health Center was added as a data collection site. The revised informed consent (APPENDIX D) and demographic questionnaire (APPENDIX L) that were used in the full study are provided.

CHAPTER IV

RESULTS

In Chapter I a brief description of the type 2 diabetes population and introductions of the mindfulness, diabetes-related distress (DRD), and self-management constructs were provided followed by a presentation of the research questions and hypotheses. Chapter 2 provided a discussion of the history, biological processes, and demographic factors associated with type 2 diabetes as well as a review of the literature of mindfulness, the related concepts awareness and acceptance, DRD, physical and social environmental factors, and self-management. In Chapter III the methodology for the current study was provided. This study was conducted to test the relationships between the mindfulness construct, the mindfulness components of awareness and acceptance, diabetes-related distress, social support, selected demographic variables, and the self-management behaviors of adults with type 2 diabetes. In this chapter the results will be presented. The results include the demographics of the study sample, the reliability coefficients of the measures that were used, and the results of the analyses related to each research hypothesis.

Description of the Sample

The sample was comprised of a convenience sample of adults between 45–65 years of age with Hbalc scores $\geq$ 6.5 % for at least one year prior to participation in the study. Participants were recruited from the Evans-Blount Community Health Center

and through an internet panel, Researchmatch.org. A G*Power analysis based on nine variable multiple regression with a moderate effect size and power of 0.8 suggested that a minimum of 100 participants should be included in the study. One hundred-fifty participants were targeted in order to account for unusable or missing data. Evans-Blount participants (n = 6) and participants through Researchmatch.org (n = 124) were offered the chance to win one of four $50.00 Visa gift cards if they provided an e-mail address after completing the survey. The Evans-Blount participants were provided with paper-pencil surveys and the responses were manually entered into Qualtrics by the researcher. Participants who were recruited through Researchmatch.org were e-mailed anonymous links to the survey that was hosted by Qualtrics. A total of 195 completed survey responses were recorded by Qualtrics. Of the 195 completed surveys, 65 surveys (33%) were unusable due to missing data, leaving130 usable surveys for analysis. Scores for each scale were computed based on the directions provided by the scale developers.

Demographic data including age, gender, ethnicity, Hba1c score, diagnosis of a first-degree relative with type 2 diabetes, presence of a co-occurring physical illness, and average monthly income were collected. The average age of participants was 55.6 years (SD = 5.5). One hundred twenty-one of the 130 participants identified as male or female; 92 were female (70.7% of the sample), and 29 were male (22.3% of the sample). The sample was predominately Caucasian (77.7% of the sample) and African American (17.7%) of the sample. The average Hba1c at the time of diagnosis was 8.6%, and average Hba1c at the time of the survey was 6.93%. Approximately 63% of the sample

indicated that they had at least one first-degree relative who had been diagnosed with type 2 diabetes. A majority of the participants indicated that they had at least one co-occurring physical illness (88.5% of the sample). Participants were asked to provide a best estimate regarding their average monthly household income. The responses ranged from $0-150,000 per month. The demographic data for the sample are summarized in Table 6.

Table 6

Demographic Characteristics of Study Sample (N = 130)

Demographic Characteristic	*n*	*M* (*SD*)	%
Collection Site			
Researchmatch.org	124	–	95.4
Evans-Blount Community Health Center	6	–	4.6
Age (Years)			
45-50			
51-55			
56-60			
61-65			
Gender			
Female			
Male			
Ethnicity			
Hispanic	2	–	–
Non-Hispanic	12	–	–
African American or Black	23	–	17.7
Caucasian or White	101	–	77.7
Asian	1	–	–
Native American	7	–	–
Alaska Native	0	–	–
Native Hawaiian	0	–	–
Pacific Islander	0	–	–
Other	2	–	–

Table 6

(Cont.)

Demographic Characteristic	*n*	*M* (*SD*)	%
First degree relative w/T2D			
Yes	82	–	63.1
No	42	–	32.3
Do Not Know	6	–	4.6
Hba1c (mean)			
At Diagnosis	116	8.7 (2.4)	–
Current	120	6.9 (1.3)	–
Co-occurring physical illness			
Yes	115	–	88.5
No	11.5	–	11.5
Monthly Household Income			
$0-999	9		
$1,000-1,999	17		
$2,000-4,999	35		
$5,000-9,999	18		
$10,000-19,999	6		
$20,000-29,999	1		
$30,000-39,999	5		
$40,000-49,999	1		
$50,000-59,999	1		
$60,000-69,999	1		
$70,000-79,999	3		
$80,000-89,999	4		
$90,000-99,999	0		
$100,000-above	6		

Additionally, the demographic questionnaire included two open-ended questions regarding participant behaviors. The first question asked participants to provide information about the behaviors that they had found helpful in treating their type 2 diabetes. The most frequently cited treatment related behaviors included following

medication, exercise, and diet recommendations, self-education about type 2 diabetes, reading food labels, weight loss, and accepting support from family and health care providers. The second question asked participants to provide information regarding the behaviors that helped them to be aware and mindful of their type 2 diabetes. The most frequently cited mindfulness related behaviors included physical exercise, meal planning and calorie counting, taking medications, checking blood glucose levels, attending support groups, and reading about type 2 diabetes.

Descriptive Statistics for Instrumentation

Descriptive statistics were calculated for each instrument as indicators of the variance in participant responses. The means, possible instrument ranges, sample ranges, and standard deviations for the Five Facet Mindfulness Questionnaire (FFMQ), the Philadelphia Mindfulness Questionnaire (PHLMS), the awareness and acceptance scales of the PHLMS, the Diabetes Distress Scale (DDS17), the Self-Care Inventory Revised (SCI-R), and the Duke Social Support Index (DSSI) were calculated and are provided in Table 7. The instrument total scale and relevant subscale reliabilities are provided for the study sample in Table 8.

The normality of the score distributions was evaluated based on skewness and kurtosis within the range of -2.0 to 2.0. The results from the Five Factor Mindfulness Questionnaire (FFMQ) were normally distributed, with a few respondents indicating higher than average total mindfulness scores. The results from the Philadelphia Mindfulness Questionnaire (PHLMS) were normally distributed. The results from the awareness subscale of the PHLMS were normally distributed, with a few respondents

indicating below average levels of self-awareness. The results from the acceptance subscale of the PHLMS were also normally distributed, with a few respondents indicating below average levels of acceptance. The results from the diabetes-distress measure (DDS17) were normally distributed, with a few respondents indicating lower than average diabetes-related distress. The results from the type 2 diabetes self-management measure (SCI-R) were normally distributed with some respondents indicating lower than average diabetes self-management. The results from the Duke Social Support measure (DSSI) were normally distributed with a few respondents indicating above average levels of social support. The implications of these findings will be discussed in Chapter V.

Table 7

Sample Means, Instrument and Sample Ranges, and Standard Deviations

Instrument	*N*	*M*	Instrument Range	Sample Range	*SD*
FFMQ	117	119.3	39.00-195.00	74.00-158.00	12.23
PHLMS	121	65.0	20.00-100.00	29.00-97.00	9.17
Awareness	122	36.8	10.00-50.00	19.00-50.00	5.46
Acceptance	126	28.1	10.00-50.00	10.00-50.00	17.01
DDS17	119	2.4	1.00-6.00	1.00-5.41	1.03
SCI-R	127	20.4	6.00-30.00	10.00-35.00	5.22
DSSI	128	28.3	7.00-33.00	17.00-38.00	5.12

Note: FFMQ = The Five Facet Mindfulness Questionnaire; PHLMS = Philadelphia mindfulness scale; Awareness = subscale of the Philadelphia Mindfulness Scale (PHLMS); Acceptance = subscale of the Philadelphia Mindfulness Scale (PHLMS); DDS17 = Diabetes Distress Scale; SCI-R = Self-Care Inventory – revised; DSSI=Duke Social Support Index

Table 8

Instrument Scale Reliabilities

Instrument	Scales	# of items	α
The Five Facet Mindfulness Questionnaire (FFMQ)[1]	Total Score	39	.767
The Philadelphia Mindfulness Scale (PHLMS)	Total Score	20	.813
The Philadelphia Mindfulness Scale (PHLMS)	Awareness Acceptance	10 10	.782 .871
Diabetes Distress Scale (DDS17)[1]	Total Score	17	.935
The Self-Care Inventory-Revised (SCI-R)	Total Score	7	.748
Duke Social Support Index (DSSI)	Total Score	11	.784

[1]The FFMQ and the DDS17 have multiple subscales; however, only the total scores were used in the current study.

Cronbach's α was calculated for each instrument in this study in order to assess the internal consistency of the total scales and the subscales that were relevant to the research questions. The alpha levels for each of the scales and subscales in the full study were comparable to those found in the pilot study and exceeded the acceptable alpha coefficient levels for social sciences research. Table 8 provides the alpha coefficients for the current study's total scales and subscales.

Research Questions and Hypotheses

The primary goal of this study was to examine the relationships between mindfulness, diabetes-related distress, social support, selected demographic variables, and self-management behaviors. In order to examine these relationships, the following research questions and hypotheses were developed. The results related to each question/hypothesis are discussed below.

Research Questions and Hypotheses 1a-1d

Research question 1 regarded the strength and direction of the relationships between mindfulness, awareness, acceptance, diabetes-related distress, social support, and self-management behaviors. Hypotheses 1a-1c suggested that there would be significant positive relationships between mindfulness, the associated constructs awareness and acceptance, and self-management. Hypothesis 1d suggested that there would be a significant negative relationship between diabetes-related distress and self-management.

To address research questions 1-1d, Pearson Product Moment Correlations were calculated (Table 9). The expected statistically significant positive relationship between mindfulness, as measured by the FFMQ and the PHLMS, and self-management was not found (r = .117, p = .213; r = .048, p = .600). Also, the expected statistically significant positive relationships between awareness and self-management (r = .107, p = .243) and acceptance and self-management were not found (r = -.060, p = .505). However, a small but statistically significant negative relationship was found between diabetes-related distress and self-management (r = -.205, p = .028).

Although not directly related to research question 1, it is noteworthy that a statistically significant relationship in the expected negative direction was found between social support and diabetes-related distress (r = -.468, p = .000), and a statistically significant positive relationship was found between social support and self-management (r = .296, p = .001). Also of note is the statistically significant negative relationship that was found between age and diabetes-related distress (r = -.319, p =.000).

Table 9

Correlation Matrix of FFMQ, PHLMS, Awareness, Acceptance, DDS17, SCI-R, Social Support, Age, and Gender

	FFMQ	PHLMS	Aware	Accept	DDS17	SCI-R	DSSI	Age	Gen
FFMQ	1								
PHLMS	.495**	1							
Aware	.192*	.656**	1						
Accept	.489**	.804**	.079	1					
DDS17	.108	.182	-.128	.355**	1				
SCI-R	.117	.048	.107	-.060	**-.205***	1			
DSSI	.063	-.052	.146	-.208*	**-.468****	**.296****	1		
Age	-.034	.008	.032	-.059	**-.319****	.032	.171	1	
Gen	.047	.116	.000	.135	.005	-.034	-.118	.155	1

Note. *p < .05 (2-tailed); **p < .01 (2-tailed). FFMQ = The Five Facet Mindfulness Questionnaire (FFMQ); Aware = Awareness (subscale of the Philadelphia Mindfulness Scale (PHLMS); Accept = Acceptance (subscale of the Philadelphia Mindfulness Scale (PHLMS); DDS17= Diabetes Distress Scale17; SCI-R= Self-Care Inventory – Revised (SCI-R); DSSI = Duke Social Support Index (DSSI).

Research Question 2

Research question 2 considered whether or not total mindfulness, awareness, acceptance, diabetes-related distress, or social support might predict a significant portion of the variance in type 2 diabetes self-management. Hypothesis 2 suggested that the stated variables would account for a significant amount of the variance in self-management scores. It should be noted that these results are to be interpreted with the understanding that several variables were excluded from each model; the FFMQ, PHLMS, awareness, and acceptance were not put into the same regression model because they appear to explain the same component of the mindfulness construct. The interpretation of the results should take into consideration that the mindfulness effect is not unique between the scales, and the regression models illustrate this shared effect.

The first regression model (Table 10) was statistically significant ($p = .002$). The analysis indicated that approximately 13.5% ($R^2 = .135$) of the variance in self-management was accounted for by a combination of mindfulness as measured by the Five Factor Mindfulness Scale, diabetes-related distress, and social support. This model demonstrated that mindfulness ($p = .024$) and social support ($p = .031$) were significant predictors of self-management. The second regression model (Table 11) was statistically significant ($p = .003$). The analysis indicated that approximately 12.2% ($R^2 = .122$) of the variance in self-management was accounted for by a combination of mindfulness as measured by the Philadelphia Mindfulness Scale (PHLMS), diabetes-related distress, and social support. The second model also demonstrated that mindfulness ($p = .003$) and social support ($p = .027$) were significant predictors of self-management. The third

regression model (Table 12) was also statistically significant. The analysis indicated that approximately 12.3% of the variance (R^2 = .123) in self-management was accounted for by a combination of awareness, acceptance, diabetes-related distress, and social support. In contrast to Model 1 and Model 2, Model 3 did not indicate the significance of a mindfulness related concept (i.e., awareness or acceptance). However, consistent with the first and second models, the third regression model indicated the significance of social support (p = .035).

Table 10

FFMQ, DRD, and Social Support as Predictors of Self-Management (N = 130)

Variable	R^2	Adj. R^2	SE	Unstand. *B*	Stand. *B*	*T*	Sig.
Model Summary	.135	.109					**.002***
FFMQ			.039	.090	.213	2.293	**.024***
DRD			.031	-.038	-.131	-1.243	.217
DSSI			.108	.236	.231	2.189	**.031***

Note. Significance determined at the $p < .05$ level

Table 11

PHLMS, DRD, and Social Support as Predictors of Self-Management (N = 130)

Variable	R^2	Adj. R^2	SE	Unstand. *B*	Stand. *B*	*T*	Sig.
Model Summary	.122	.098					**.003***
PHLMS			.057	.123	.200	2.159	**.033***
DRD			.030	-.035	-.123	-1.176	.242
DSSI			.102	.229	.229	2.238	**.027***

Note. Significance determined at the $p < .05$ level

Table 12

Awareness, Acceptance, DRD, and Social Support as Predictors of Self-Management (*N* = 130)

Variable	R^2	Adj. R^2	SE	Unstand. *B*	Stand. *B*	*T*	Sig.
Model Summary	.123	.090					**.007***
Awareness			.090	.146	.151	1.616	.109
Acceptance			.075	.107	.138	1.430	.156
DRD			.516	-.033	-.115	-1.079	.283
DSSI			.104	.223	.223	2.134	**.035***

Note. Significance determined at the $p < .05$ level

Research Question 3

Research question 3 explored whether diabetes self-management would be mediated by levels of mindfulness and diabetes-related distress by explaining how diabetes-related distress and mindfulness and the associated constructs awareness and acceptance are related to diabetes self-management. In order for a mediation relationship to occur, the independent variables total mindfulness, the related constructs awareness and acceptance, and diabetes-related distress must demonstrate that they are significant independent predictors of the dependent variable, self-management, in the regression model. In the current study, mindfulness demonstrated significance in two of the regression models; however, diabetes-related distress was not found to be a significant predictor of self-management in any of the regression models. As such, a full mediation analysis with these variables could not be conducted.

Research Question 4

The final research question considered after controlling for mindfulness, acceptance, awareness, and diabetes-related distress whether the demographic variables social support, age, gender, and income level would further predict self-management, with the expectation that income level would be the strongest predictor of self-management. Each participant was asked to provide age in years, identify as male or female, and a best estimate of monthly income. Eighty-one of the 130 participants answered the income question. An analysis of the distribution of the income data were significantly positively skewed (skewness = 2.512; kurtosis = 5.886) with potential for polluting the regression analysis; therefore, the income data were removed from the analysis.

The hierarchical regression models were designed to predict the extent that the demographic variables (i.e., age and gender) would predict self-management over and above the theoretical variables (i.e., mindfulness as measured by the FFMQ and the PHLMS, awareness, acceptance, DRD, and social support). The hierarchical regression illustrated in Table 13 indicated the significance of Model 1 (mindfulness as measured by the FFMQ, diabetes-related distress, social support; p =.002) and Model 2 (age, gender; p = .001). Approximately 13.5% of the variance in self-management was explained by Model 1, and approximately 13.7% of the variance in self-management was explained with the addition of the demographic variables in Model 2. The addition of the demographic variables, age and gender, explained .2% more variance than the theoretical variables alone. This difference was non-significant; therefore, interpretation is limited.

Table 13

Hierarchical Regression of Theoreticals and Demographic Variables as Predictors of Self-Management (N = 130)

Variable	R^2	Adj. R^2	R^2 Change	Sig. F Change	Model Sig.
Model 1 (FFMQ, DRD, Social Support)	**.135**	.109	.135	.002	**.002**
Model 2 (Theoreticals + Age and Gender)	.137	.094	.002	.886	**.001**

Note. Significance evaluated at the $p < .01$ and $p < .05$ levels

The hierarchical regression illustrated in Table 14 indicated the significance of Model 1 (mindfulness as measured by the PHLMS, diabetes-related distress, social support; p =.003) and Model 2 (age, gender; p = .010). Approximately 12.2% of the variance in self-management was explained by the theoretical variables, and approximately 13.2% of the variance in self-management was explained with the addition of the demographic variables. The addition of age and gender explained approximately 1% more variance than the theoretical variables alone. Similar to the model illustrated in Table 13, this difference was also non-significant; therefore, interpretation is limited.

The hierarchical regression illustrated in Table 15 indicated the significance of the theoretical variables (awareness, acceptance, diabetes-related distress, social support; p =.007) and the addition of the demographic variables (age, gender; p = .020). Approximately 12.3% of the variance in self-management was explained by the theoretical variables, and approximately 13.2% of the variance in self-management was

explained with the addition of age and gender. The addition of age and gender explained .9% more variance than the theoretical variables alone. Similar to the models illustrated in Tables 13 and 14, this difference is also non-significant; therefore, interpretation is limited.

Table 14

Hierarchical Regression of Theoreticals and Demographic Variables as Predictors of Self-Management (N = 130)

Variable	R^2	Adj. R^2	R^2 Change	Sig. F Change	Model Sig.
Model 1 (PHLMS, DRD, Social Support)	**.122**	.098	.122	.003	**.003**
Model 2 (Theoreticals + Age and Gender)	**.132**	.090	.009	**.571**	**.010**

Note. Significance evaluated at the $p < .01$ and $p < .05$ levels

Table 15

Hierarchical Regression of Theoreticals and Demographic Variables as Predictors of Self-Management (N = 130)

Variable	R^2	Adj. R^2	R^2 Change	Sig. F Change	Model Sig.
Model 1 (FFMQ, DRD, Social Support)	**.123**	.090	.123	.007	**.007**
Model 2 (Theoreticals + Age and Gender)	**.132**	.094	.009	**.587**	**.020**

Note. Significance evaluated at the $p < .01$ and $p < .05$ levels

Summary

In this chapter, the results of the study were presented. A description of the study sample (n = 130) was provided, and descriptive statistics for the study instruments were given including the scale ranges and alpha coefficients for the current study sample. The results of the tests of internal reliability indicated that each instrument demonstrated reliability. The results of the tests for normality indicated normal distributions for the results of each scale. Additionally, the analysis of the data for each research question and hypothesis was presented. The analysis of the hypotheses demonstrated the most significance between mindfulness and self-management and social support and self-management. In Chapter V, a discussion of the results of each hypothesis and major findings are provided, limitations are discussed, the implications for counselors, counselor educators, and type 2 diabetes clinicians are offered, and directions for future research are proposed.

CHAPTER V

DISCUSSION

In Chapter IV, the results of the study exploring the relationships between mindfulness, diabetes-related distress, selected demographic variables, and self-management were presented. In this chapter, a brief overview of the study, participants, and instrumentation, and discussion of the results and major findings are provided. The limitations of the study are noted, the implications and areas for future research relevant for counselors, counselor educators, and type 2 diabetes practitioners are presented.

Overview of the Study

The extensive literature regarding type 2 diabetes is clear that the self-management of the disease entails more than attention to nutrition, physical activity, and glucose monitoring. Effective management also requires attention to the numerous environmental, social, and emotional challenges that are associated with the disease and the development of effective coping strategies. Mindfulness, as a set of behaviors and practices that encourage a relationship toward events that is open, observant, and non-judgmental, has been reported as a promising approach that helps to lessen the burden of those who suffer with type 2 diabetes. Because of the therapeutic potential of mindfulness-based approaches in the self-management of type 2 diabetes, mental health professionals and specialists in diabetes care are beginning to explore opportunities to integrate the tenets of mindfulness into holistic diabetes care.

Mindfulness-based therapies have been used successfully for the treatment of mood disregulation. The prevalence of mood disorders and mood related conditions (i.e., diabetes-related distress) in the type 2 diabetes population suggests that mindfulness-based therapies have potential to address the emotional challenges of individuals with type 2 diabetes as well. However, to date no researchers have sought to establish a connection between mindfulness and diabetes self-management. The purpose of this study was to explore the relationships among mindfulness, mindfulness concepts of awareness and acceptance, diabetes-related distress, social support, and type 2 diabetes self-management. A further goal was to examine if diabetes-related distress had a mediating effect on the relationship between mindfulness and self-management and if selected socio-demographic variables, age and gender, showed any relationship to diabetes self-management.

Participants

Participants were recruited from the Evans-Blount Community Health Center and the internet panel, Researchmatch.org. The Evans-Blount Community Health Center offers primary health care services to low-income and uninsured patients. Evans-Blount participants were screened for study eligibility by the health center staff and referred to the student researcher based on a type 2 diabetes diagnosis of Hbalc $\geq$ 6.5. Following the referral, the student researcher met with the patients to further qualify them based on age (i.e., 45-65 years of age) and length of diagnosis (i.e., at least one year prior to participation in the study).

Researchmatch.org is an internet panel that is a free service to IRB approved researchers who are affiliated with a Clinical and Translational Science Awards institution. The service is funded in part by the National Institutes of Health Clinical and Translational Science program and administered by Vanderbilt University with the purpose of promoting research by connecting potential research volunteers with researchers. Potential volunteers are recruited through social media, flyers, and outreach at the 87 institutional partners throughout the United States. Potential volunteers enter profile information into an online database that is searchable by researchers. If the potential volunteer is a match for a study based on the researcher's search of the online database, the volunteer will be contacted by e-mail and given the option of participating in the study. When volunteers indicate their willingness to participate in a study, their contact information is forwarded to the researcher's list of eligible volunteers. When new volunteers are added to the researcher's list of volunteers, the researcher receives an e-mail alert to send the list of volunteers an e-mail with a link to the electronic survey.

In the current study, Researchmatch.org participants were identified by the student researcher by searching the database by age (i.e., 45-65 years of age) and condition identifiers (i.e., type 2 diabetes, sugar, sugar diabetes, diabetic, high blood sugar, high blood glucose). Volunteers meeting the study criteria were sent an e-mail invitation to participate in the study. Volunteers who responded to the invitation e-mail were added to the student researcher's online list of volunteers who had given consent to be contacted for the study. The student researcher sent the consenting volunteers an e-mail with an anonymous link to the survey administered by Qualtrics. Once the

volunteers entered the survey, they were further qualified for participation based on a type 2 diabetes diagnosis for at least one year and the absence of schizophrenia or other psychosis requiring anti-psychotic medications. A total of 195 surveys were completed from the Evans-Blount Community Health Center and Researchmatch.org. Sixty-five surveys (33%) were significantly incomplete and deleted from the dataset, leaving130 surveys for data analysis. It was not possible to determine differences in the participants who chose to complete the survey and those who did not complete the survey due to insufficient data.

The average age of participants was 55.6 years. The average age of study participants is consistent with most recent reports from the Centers of Disease Control (CDC) regarding trends of diabetes diagnosis. In 2011, 63% of the adult incident cases of type 2 diabetes were diagnosed between 40 and 64 years of age (CDC, 2013). Of the 121 participants indicating gender, 92 were female (70.7%) and 29 were male (39.2%). The most recent CDC data regarding the sex of adults diagnosed with type 2 diabetes indicates that men and women are diagnosed at similar rates with a slight increase in male diagnoses between 1980 to 2011 (2.7% to 6.9% for men compared 2.9% to 5.9% for women). Thus, females were over-represented in the current sample. The female presence in the study sample may be attributed to the Researchmatch.org volunteer recruitment methods (i.e., social media, flyers) and the gender demographics of the Researchmatch.org volunteer database at the time of the study- approximately 71.1% female, 28.7% male, and 0.2% transgender (Researchmatch.org).

The most prevalent racial group in the study was Caucasian, making up 77.7% of the sample, followed by African American, making up 17.7% of the sample. In 2011, 11.2% Caucasian adults between 45 and 64 were diagnosed with type 2 diabetes compared to 17.3% of African Americans (CDC, 2013). As with gender, the difference between the study sample's racial demographics and the national population of adults diagnosed with type 2 diabetes may be attributed to the predominately Caucasian composition of the convenience sample provided by Researchmatch.org. The racial demographics for the Researchmatch.org volunteer database at the time of the study were approximately 78.0% Caucasian and 11.3% African American (Researchmatch.org).

It is known that genetics play a significant role in type 2 diabetes diagnosis. If an adult is diagnosed with type 2 diabetes before age 50, then their child has a 1 in 7 chance of the diagnosis; if the parent's diagnosis occurred after 50, then the child has a 1 in 13 chance. If both parents were diagnosed with type 2 diabetes, then the child's chance of diagnosis raises to 1 in 2 (American Diabetes Association, 2013). A majority of participants, approximately 63% of the sample, reported that at least one parent had been diagnosed with the disease.

A majority of study participants (88.5%) indicated that they had at least one co-occurring physical illness. These results are consistent with The Medical Expenditure Panel Survey which found that most adults diagnosed with type 2 diabetes have at least one comorbid chronic disease (i.e., heart disease, kidney disease, neuropathy, and glaucoma) and as many at 40% have at least three (Wolff, Starfield, & Anderson, 2002).

Instrumentation

In order to test the relationships between mindfulness, the mindfulness concepts of acceptance and awareness, diabetes-related distress, selected environmental and demographic variables, and diabetes self-management, participants were asked to complete the following surveys: The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), The Philadelphia Mindfulness Scale (PHLMS; Cardaciotto et al., 2008), The Diabetes Distress Scale (DDS; Polonsky et al., 2005), The Self-Care Inventory-revised (SCI-R; Weinger et al., 2005), The Duke Social Support Index (DSSI; Landerman, George, Campbell, & Blazer, 1989), and a demographic questionnaire developed by the author of the study.

The FFMQ demonstrated strong internal consistency (α = .767) for use with the current sample. This is in line with previous research demonstrating the FFMQ's high reliability in an adult sample (Baer et al., 2008). The PHLMS demonstrated strong internal consistency (α = .813) as did the awareness (α = .782) and acceptance (α = .871) subscales. Strong reliability scores for the DDS17 (α = .935) and the SCI-R (α = .748) were found. The DDS17 and the SCI-R performed as expected in terms of reliability, as they were designed for use with type 2 diabetes populations. The short form of the DSSI also demonstrated strong internal consistency (α = .784). These reliability results were consistent with the reliability results reported from a study that used the DSSI to measure the essential elements of social support related to the mental health outcomes and use of health services in treating the elderly with non-psychiatric medical illnesses (Koenig et al., 1993).

Reliability scores for each scale ranged from .748 to .935 with the sample population for this study. Reliability scores for each instrument used in the current study were strong and in line with the literature on norming for each assessment. The FFMQ and PHLMS scores are of particular note, because the reliability scores provide researchers with a rationale for continuing to use the FFMQ and the PHLMS to assess the mindfulness behaviors of adults with type 2 diabetes. The reliability scores for the DSSI provided similar support for continued use of the DSSI, as the short form of the DSSI was the least studied and researched of the instruments. The findings of the current study suggest its inclusion as a reliable assessment of social support among adults with type 2 diabetes.

For the current study, Dr. Bennett Ramsey from the UNC-Greensboro Department of Religious studies was asked to review two of the demographic questionnaire items and make suggestions regarding the readability and relevance to an adult population. For the first item, *What have you found to be most helpful in treating your type 2 diabetes*?, Dr. Ramsey recommended that the researcher use the word *treatment* in order to elicit responses related to behaviors relevant to medical recommendations such as glucose testing, taking medications, and carbohydrate counting. For the second item, *Are there activities that you engage in that keep you aware and mindful of your type 2 diabetes*?, Dr. Ramsey cautioned against using the word *mindfulness* because of culturally embedded beliefs associated with the term. According to Dr. Ramsey, the word *mindful* would be more culturally neutral and have a greater likelihood of eliciting responses related to the use of mindfulness-based behaviors.

Discussion of Hypotheses

The hypotheses are restated below and followed by discussion. Hypothesis one was divided into four sub-hypotheses.

Hypothesis 1a. The researcher hypothesized that there would be a significant positive relationship between mindfulness and self-management. This hypothesis was not fully supported by the data. The analysis demonstrated a positive relationship between mindfulness and self-management; however, the correlation between mindfulness as measured by the FFMQ and self-management was not statistically significant at the $p > .05$ level. Further, the correlation between mindfulness as measured by the PHLMS and self-management was not statistically significant at the $p > .05$ level. These findings were not expected and inconsistent with previous research using mindfulness based methods with adults with type 2 diabetes (Gregg et al., 2007) and the relevance of mindfulness in samples of adults with type 2 diabetes (Hernandez, 1991; Hernandez, Antone, et al., 1999; Ingadottir & Halldorsdottir, 2008).

One explanation for the absence of a statistically significant relationship between mindfulness and self-management might be the moderate levels of diabetes-related distress found in the sample or the presence of unmeasured mood conditions. The literature on adults with type 2 diabetes indicates that this is a population heavily burdened by mood related disorders and diabetes-related distress which encompasses diabetes related emotional burden, physician related distress, regimen related distress, and interpersonal distress (Gonzalez et al., 2011; Mezuk et al., 2008; Rush et al., 2008). The results of this correlation analysis may show that while adults with type 2 diabetes

who suffer with moderate levels diabetes-related distress are capable of demonstrating mindfulness, their capacity to demonstrate mindfulness behaviors to the extent that their self-management is influenced may be significantly compromised.

Hypotheses 1b and 1c. The researcher hypothesized that there would be a significant positive relationship between awareness and self-management. This hypothesis was not fully supported by the data. The analysis demonstrated a positive relationship; however, the correlation between awareness and self-management was not statistically significant. It was also hypothesized that there would be a significant positive relationship between acceptance and self-management. This hypothesis was not supported by the data. The analysis demonstrated a negative relationship, and the correlation between acceptance and self-management was not statistically significant.

Awareness and acceptance are concepts that are related to the total mindfulness construct. These related concepts performed consistently with the total mindfulness data in the current study by failing to demonstrate a significant relationship to self-management. Although awareness and acceptance appear prominently in the type 2 diabetes literature and present as potentially relevant components of the self-management process, it is possible that the significance of awareness and acceptance are overwhelmed by the influence of diabetes-related distress and/ or other unmeasured mood related factors.

Hypothesis 1d. The researcher hypothesized that there would be a significant negative correlation between diabetes-related distress and self-management behaviors. This hypothesis was supported by the data. The analysis demonstrated the expected

statistically significant negative relationship. The significance of diabetes-related distress is consistent with previous studies that indicate the significance of emotional distress to diabetes self-management (McKellar, Humphreys, & Piette, 2004). However, due to the weak strength of the relationship (r = -.205), the practical significance of the relationship between diabetes-related distress and self-management is questionable.

Hypothesis 2. The researcher hypothesized that mindfulness, awareness and acceptance, and diabetes-related distress would explain a significant portion of the variance in diabetes self-management. This hypothesis was partially supported by the data. Initially, data from both mindfulness measures and awareness and acceptance were entered into the regression model as predictor variables. However, likely multicollinearity between the related mindfulness variables resulted in no significance between the mindfulness variables and the outcome variable, self-management. When the mindfulness variables were entered into the regression model individually, mindfulness as measured by the FFMQ and the PHLMS, and the social support variable demonstrated significance as predictors of self-management as expected. However, acceptance and awareness failed to demonstrate statistical significance, and diabetes-related distress failed to demonstrate statistical significance in all of the regression models. It should be reiterated that the interpretation of the regression results should take into consideration that the mindfulness effect is not unique between the FFMQ and PHLMS scales, and the results of regression models illustrate a shared effect of the variables.

The first regression model included mindfulness as measured by the FFMQ, diabetes-related distress, and social support. This model was statistically significant. The model indicated that approximately 13.5% of the variance in self-management was accounted for by a combination of mindfulness, diabetes-related distress, and social support. As expected, this model demonstrated that mindfulness and social support were significant predictors of self-management. However, the diabetes-related distress data did not demonstrate the expected statistical significance as a negative predictor of self-management.

The second regression model included mindfulness as measured by the PHLMS, diabetes-related distress, and social support, and was statistically significant. This model indicated that approximately 12.2% of the variance in self-management was accounted for by a combination of mindfulness, diabetes-related distress, and social support. As expected, the second model also demonstrated that mindfulness and social support were significant predictors of self-management. However, again, the diabetes-related distress data did not perform as expected by failing to demonstrate statistical significance as a negative predictor of self-management.

The third straight regression model included awareness, acceptance, diabetes-related distress, and social support as predictor variables, and this model was also statistically significant. The analysis indicated that approximately 12.3% of the variance in self-management was accounted for by a combination of awareness, acceptance, diabetes-related distress, and social support. The hypothesis that awareness and acceptance would perform as significant predictors of self-management was not

supported. The third regression model also did not support the hypothesis that diabetes-related distress would perform as a significant negative predictor of self-management.

It is interesting that the mindfulness variables in Model 1 (Table 10) and Model 2 (Table 11) were statistically significant predictors of self-management, but the mindfulness-based variables awareness and acceptance included in Model 3 (Table 12) were not statistically significant predictors of self-management. One explanation for this inconsistency is that the relationship between mindfulness and self-management is best captured when mindfulness as a whole construct is used. These findings are consistent with the "synergistic and mutually reinforcing" properties of the mindfulness components as discussed in Grossman and Van Dam (2011, p. 220). However, Model 3 performed consistently with Model 1 and Model 2 by demonstrating the predictive value of social support on self-management. This finding is consistent with the literature on social support and type 2 diabetes that suggests that social support is an integral factor in effective self-management of the disease (van Dam et al., 2005).

It is unclear why diabetes-related distress did not demonstrate significance in any of the models, especially given the moderate levels of diabetes-related distress found in the sample. One possible explanation is that a portion of the sample may have been treated for symptoms of depression with antidepressant medications. While it is true that patients exhibiting symptoms of depression may have difficulty meeting their diabetes management goals, symptoms of emotional distress and the ability to engage in self-management behaviors tend to improve when antidepressants are used (Rush et al., 2008). For the current study, data regarding depression diagnoses and use of

antidepressants were not collected, so it is only possible to speculate about the influence of clinical depression and antidepressant use on the sample.

Hypothesis 3. The researcher hypothesized that diabetes-related distress (DRD) would mediate the relationships between mindfulness and diabetes self-management, awareness and diabetes self-management, and acceptance and diabetes self-management. This hypothesis was not supported. The mediation analysis was based on the recommendations of Baron and Kenny (1986) that state in order for the mediation analysis to be conducted there must be significant relationships between the independent and mediating variables and the mediating and dependent variables. In this case, the mediation analysis was not conducted because diabetes-related distress was not a significant predictor of self-management in any of the regression models. However, it should be noted that Hayes (2009) offered an alternative mediation model that does not require a significant association between the independent and dependent variables when one of the path coefficients is negative.

As stated in the previous discussion of Hypothesis 2, it is not clear why diabetes-related distress did not perform as a significant predictor of self-management. The non-significance of the variable may be related to the use of antidepressant medications that mitigated the expected negative effect of diabetes-related distress on self-management. Further, it has been reported that psychotherapy, particularly cognitive behavioral therapy, may have a promising role in improving depressive symptoms and glycemic levels as measured by improved Hba1c levels (Lustman & Clouse, 2002). Because data regarding antidepressant use and participation in psychotherapy were not collected in the

current study, it is only possible to speculate that treatments for depression may have been a significant factor in the relationship between diabetes-related distress and self-management.

Hypothesis 4. The final hypothesis predicted that after controlling for mindfulness, awareness, acceptance, diabetes-related distress, and social support, the socio-demographic variables (i.e., age and gender) would explain a significant amount of variance in diabetes self-management. It was initially hypothesized that income level would make the strongest contribution to the regression model. Because of errors in how participants recorded their income (e.g., listing weekly income instead of monthly and missing data), the income data were excluded from the hierarchical regression model. The hypothesis that age and gender would explain a significant amount of variance in self-management over and above the theoretical variables was not supported by the data.

The hierarchical regression analyses demonstrated that the addition of the demographic variables, age and gender, added only slight increases in variance (.2% - 1%), and the differences in variance were not statistically significant. The literature is unclear about the relative difficulties of self-management associated with age, and there is scant anecdotal support for the increased self-management difficulties that may be faced by men (Neukrug, Britton, & Crews, 2013). These results suggest the importance of continuing to explore the extent of how mindfulness-related variables and demographic variables might be important factors for those who are affected by type 2 diabetes.

Summary of Major Findings

Mindfulness

Mindfulness was defined for the purposes of this study as a process of bringing attention to experience in order to increase awareness and an attitude of openness toward the experience (Bishop et al., 2004). The hypothesis that mindfulness would positively contribute to the ability to effectively self-manage type 2 diabetes was based on empirical studies that indicated that mindfulness behaviors were relevant to helping adults with type 2 diabetes enhance overall quality of life, lower Hba1c levels, and develop the behaviors necessary for the successful management of type 2 diabetes (Gregg et al., 2007; Rungreangkulkij et al., 2011; Surwit, 2005). The regression analyses of the current study provide additional empirical support for the potential value of the total mindfulness concept to effective self-management.

Awareness and Acceptance

Awareness was defined for the purposes of this study as the ability to attend to internal and external events as they arise in the present moment (W. B. Brown & Ryan, 2004). Acceptance was defined as an attitude of nonjudgment toward experience and absence of avoidance of disturbing thoughts and feelings (Hayes et al., 1999; Gregg et al., 2007). The literature reviewing the intersection of type 2 diabetes and mindfulness tends to focus on the relevance of these related concepts, awareness and acceptance (Hernandez, Antone, et al., 1999; Ingadottir & Halldorsdottir, 2008; Richardson et al., 2001). Therefore, the study methodology was designed to make these sub-constructs of the total mindfulness construct of particular focus. The results of the awareness and

acceptance data analyses were inconsistent with what was expected from the existing research. However, as stated in the discussion of hypotheses 1b and 1c, that awareness and acceptance were non-significant predictors of self-management, and the total mindfulness construct was found to be a significant predictor speaks to the possibility that the sub-concepts have strength when they are considered within mindfulness as a whole.

Although the observing and nonjudging subscales of the FFMQ were not subjects of the research questions in the current study, the researcher entered these variables into the correlation and regression analyses due to their theoretical similarity to the awareness and acceptance concepts that were subjects of the study. As expected, there were no significant correlations between observing, nonjudging, and self-management, and observing and nonjudging did not perform as significant predictors of self-management. However, the corresponding total mindfulness construct, the FFMQ, did perform as a significant predictor of self-management. This additional analysis supports the strength of the total mindfulness construct as a significant predictor of self-management and how mindfulness *as a whole* may best help those struggling with diabetes self-management.

Diabetes-related Distress

Diabetes-related distress encompasses the emotional challenges of living with type 2 diabetes, the relational conflicts caused by interactions with health care providers, inadequate social supports, and the cumulative stress of daily compliance with regimen recommendations (Gonzalez et al., 2011). Diabetes-related distress was included in the current study due to the documented prevalence of mood related conditions in the type 2

diabetes population and the research indicating that mood related conditions are important clinical factors in assessing an individual's ability to properly manage their type 2 diabetes (Lustman et al., 2000; McKellar et al., 2004). The results of the current study related to diabetes-related distress were not expected based on the existing research. The DDS17 is scored on a scale of little or no distress < 2.0, moderate distress 2.0-2.9, and high distress ≥ 3.0 (L. Fisher et al., 2012). The average diabetes-related distress score for the participants of the current study was in the moderate distress range (2.3905). As such, the current results did not demonstrate the statistical significance of diabetes-related distress as a predictor of self-management as was expected based on the literature indicating diabetes-related distress as a critical consideration in the lives of adults with type 2 diabetes. The lack of significance of this key variable might be attributed to the relative affluence of the Researchmatch.org participants and their access to health care services.

Social Support

For the purposes of this study, social support took into account the number of social relationships, the number of significant social interactions, and the perceived quality of the social relationships (Wardian et al., 2013). The social support construct was added to the study due to the considerable theoretical and empirical literature indicating the central role of social support in the lives of those living with type 2 diabetes (Barrera et al., 2006; Carter-Edwards et al., 2004; Chlebowy & Garvin, 2006; van Dam et al., 2005). All of the regression models (Hypothesis 2) indicated social support as a statistically significant predictor of self-management. Although not the

subject of the current study, it is noteworthy that a significant negative correlation was found between social support and diabetes-related distress (r = -.468, p = .000), and a significant positive correlation was found between social support and self-management (r = .296, p = .001). As such, the data consistently indicated that social support is not only relevant to diabetes-related distress, but a potentially integral factor in the self-management process.

Age and Gender

Adults 45 to 65 years of age were recruited to participate in this study. Neither age nor gender demonstrated meaningful bivariate relationships with the outcome variable, self-management. The correlation analysis demonstrated a statistically significant negative relationship between age and diabetes-related distress indicating that younger age was related to lower diabetes-related distress. This finding is consistent with previous research that indicated an inverse relationship between age and diabetes-related distress (Fisher et al., 2010). One explanation for this association is that younger people may experience a greater diabetes related burden compared to older people because of fewer years of experience learning how to effectively manage the disease. Further, younger people may have the additional stress of managing family and work related responsibilities.

The hierarchical regression analysis indicated that age and gender were not statistically significant predictors of self-management over and above the theoretical variables. The literature regarding the incidence of type 2 diabetes indicates that men and women are diagnosed with the disease at roughly the same rate. Despite similar rates of

diagnosis, there is some anecdotal support for the specific challenges of self-management that may be faced by men (Neukrug et al., 2013). Significant differences in self-management between men and women were not supported in the current study. It is possible that gender did not emerge as a significant predictor of self-management because the sample was overwhelmingly female (of the 121 participants indicating gender 92 were female [70.7%] and 29 were male [39.2%]). A larger sample with more men might have demonstrated the self-management difficulties experienced by men that are suggested in the literature.

Treatment and Mindfulness Behaviors

The current study utilized a quantitative methodology; however, two qualitative questions were posed in the demographic questionnaire. The first question: *What have you found to be most helpful in treating your type 2 diabetes?* was designed to elicit information regarding treatment related behaviors. The most frequently reported treatment related activities included medication, diet, and exercise modifications, following physician recommendations, research about the disease, and weight loss. The second question: *Are there activities that you engage in that keep you aware and mindful of your type 2 diabetes*? was designed to elicit information about mindfulness behaviors. The most frequently reported activities included physical exercise, meal planning and calorie counting, taking medications, checking blood glucose levels, attending support groups, and reading about type 2 diabetes. Although a formal qualitative analysis of this data exceeded the purpose of the current study, the answers to the first question suggest that the majority of participants were knowledgeable about basic self-management

behaviors. However, the responses to the second question suggest that the respondents were somewhat less informed about the nature of mindfulness behaviors. There were significantly fewer responses to the mindfulness question, and most of the responses included treatment considerations such as diet, exercise, and medication modifications. Two respondents cited the use of Yoga. These results indicate that the sample may have been unfamiliar with behaviors that encourage the mindfulness trait.

Limitations

Several limitations exist in the current study that may have compromised internal and external validity of the results. The convenience sampling method used in the current study limits generalizability due to the lack of random sampling. Generally, data collection from a randomized sample is preferred in order to encourage variance across scales and enhance the ability to generalize conclusions to the broader population of adults with type 2 diabetes. A small number of participants were recruited from a community health clinic (n = 6); however, the majority of the study participants were recruited from the online research volunteer database, Researchmatch.org (n = 124). Researchmatch.org volunteers are heavily recruited from university and medical research settings. As such, the volunteers for the current study were not the preferred randomized sample but rather a convenience sample of adults who were previously recruited to participate in research studies by Researchmatch.org. Therefore, the study is limited to the variance of the participants recruited by Researchmatch.org, who tended to be Caucasian and affluent with access to primary and specialist health care services. The remaining participants (n = 6) were patients of the Evans-Blount Community Health

Center. The Evans-Blount participants were also a convenience sample and limited in their generalizability due to their low-income status and being predominately African American.

The study methodology was based on participant self-report. Surveys that are dependent on participant self-report are subject to the participants' ability to accurately understand the survey items and recall their personal experiences. Therefore, some of the responses may have been inaccurate due to the respondents' inability to clarify the meaning of questions or memory limitations. Because study participants were required to have had at least one year of experience self-managing their type 2 diabetes, they may have assumed that the answers to the questions would negatively or positively assess their ability to engage in recommended self-management behaviors. Even though the participants were informed that their responses were confidential and only viewed by the student researcher and her advisor, participants may have succumbed to expectation bias and provided responses that would have been desirable to their health care providers rather than reflecting their actual experiences.

Participants were qualified for the study based on being 45-65 years of age and diagnosis for at least one year prior to the study. The literature on adults with type 2 diabetes indicates that this is a population with significant co-occurring physical and mental chronic conditions (i.e., glaucoma, dementia, anxiety, and depression) that might make the accurate completion of a lengthy and detailed survey more difficult. In fact, participants from the Evans-Blount Community Health Center frequently requested assistance reading the survey and recording responses citing eyesight deficiencies. The

student researcher did in fact provide assistance to most of the Evans-Blount participants, and the assistance provided to these participants may have introduced interviewer bias.

Implications

Counselors and Counselor Educators

Counseling interventions have been recommended to support the type 2 diabetes self-management process. Renosky, Hunt, Briggs, Wray, and Ulbrecht (2008) discussed the relevance of counseling approaches to the needs of people living type 2 diabetes. Specifically, the authors found that when working with patients with type 2 diabetes, counseling needs may include reducing barriers to self-care, creating realistic self-care plans, managing emotional distress and functional limitations, weight loss, and finding balance between tight glucose control and quality of life. The current study provides support for the incorporation of mindfulness approaches when counseling adults with type 2 diabetes in order to encourage effective self-management.

It has been recognized that the multi-contextual and problem-saturated nature of type 2 diabetes self-management indicates counseling approaches. Reeder (1998) applied the *Invitational Counseling Model* (Purkey & Schmidt, 1996) to the provision of type 2 diabetes related care and education. The model emphasizes four assumptions: (a) people are able, valuable, and capable of self-direction; (b) helping should be a cooperative and collaborative process; (c) people are relatively limitless in their potential for development; and (d) human potential can be best realized through involvement within organizations intentionally designed to encourage human development. As applied to the care of a person with type 2 diabetes, the counselor would enter the relationship believing

the client to be valuable and capable of managing her diabetes. The counselor would intentionally validate the numerous challenges associated with self-management and the efforts that the client has made to meet the challenges, collaborate with the client in developing individualized health goals, and remain optimistic regarding movement toward goals.

By demonstrating that mindfulness is a statistically significant predictor of type 2 diabetes self-management, the current study provides support for the use of counseling methods that encourage mindfulness-based behaviors with the use of mindfulness-based approaches and interventions. In a recent review of the most common health concerns of men and the implications for counselors, Neukrug et al. (2013) cited the lack of training counselors receive regarding health related issues and more specifically the health related issues that affect men. In their discussion, the authors cited type 2 diabetes as one of the ten most common related health concerns for men and point to the specific mental health and self management concerns that emerge with those affected by the disease, stating "[p]sychological concerns from diabetes include depression, anxiety, and loss of hope, which can affect both adherence to a medical plan and increased complications" (393). Although men and women are affected by type 2 diabetes at roughly the same rates, men may face different challenges when it comes to effectively managing their type 2 diabetes due to the constant monitoring required for successful management. Neukrug et al. (2013) recommended the potential relevance of family counseling given the social and environmental challenges and therapies that can help those diagnosed learn to counter the dysfunctional thoughts that are associated with the stress of long-term management and

complications. Although mindfulness-based counseling approaches (i.e., ACT, MBCT) were not specifically recommended by the authors, such approaches have been found to be particularly effective in helping patients to manage dysfunctional thought patterns.

Numerous studies have indicated the effects of mindfulness-based approaches on mood related disorders and provided support for the clinical use of mindfulness interventions with mental health conditions (Bohlmeijer, Prenger, Taal, & Cuijpers, 2010; W. B. Brown et al., 2007; Teasdale, 1999). The current study contributes to the literature that indicates that mindfulness behaviors may be relevant to the management of physical health conditions, specifically type 2 diabetes (Gregg et al., 2007; Hernandez, Antone, et al., 1999; Ingadottir & Halldorsdottir, 2008; Richardson et al., 2001). As such, there is a need for counselors who are trained to use mindfulness-based approaches to meet the needs of clients with mental *and* physical health conditions. Glueck (2013) completed a study that specifically addressed the counselor training needs of counselors who work with patients with mental and physical health concerns. The qualitative study explored the roles, attitudes, and training needs of behavioral health clinicians working in integrated primary care practices. The role of the behavioral health clinician is positioned as a part of the medical team in an integrated primary care setting. By exploring the experiences of behavioral health clinicians, Glueck (2013) identified a need for counselor education that adequately prepares counselors-in-training to enter integrated care settings that require the treatment of mental and physical health concerns.

Traditionally, the in-depth training for counselors on common health concerns and disabilities and the overlap between these concerns and mental health has been

concentrated in rehabilitation counseling programs rather than community mental health programs. However, the prevalence of physical health conditions in the general population and the apparent overlap between physical and mental health diagnoses suggest the need for the addition of training about medical populations and the associated evidenced-based practices to the counselor education curricula. According to Glueck (2013), "[c]ounselors are in need of training specific to meet the needs of the integrated primary care setting" (p. 157).

Type 2 Diabetes Clinicians

The significance of mindfulness in the current study suggests the relevance of a process oriented approach. Rayman and Ellison (2000) discussed a shift in thinking about self-management from a definite, desired action to a more complex set of changes over time. The authors proposed that by attending to the learning process, diabetes educators and clinicians can help patients to normalize the lifestyle and emotional challenges that they may encounter. Rayman and Ellison (2000) recommended that providers partner with patients in order to communicate a collaborative relationship that values the expertise of patient and provider. For example, the patient might demonstrate expertise by sharing information about himself (i.e., values, lifestyle, challenges) that assists the provider in sharing information that would be helpful in solving a problem impeding the patient's ability to engage in successful self-management. Finally, the authors suggested the development of a culture amongst health providers that values patients and allows the time for patients to feel genuinely known and cared for. In order to attend to the individual experiences of the patient, a *caring* culture is created that is

interdependent, not adversarial. The relationship between mindfulness and self-management provided in the current study may provide support for the integration of counseling interventions that utilize mindfulness-based approaches into type 2 diabetes treatment planning.

Despite this study's finding that diabetes-related distress was not a significant predictor of self-management, the documented prevalence of psychological problems in the type 2 diabetes population makes clear that type 2 diabetes treatment planning should include assessments for depression, anxiety, and diabetes-related distress and interventions designed to meet the specific mental health needs of this group.

Future Research

Because of the expected absence of racial and ethnic diversity in the study sample, race and ethnicity were not included as key demographic variables. However, it is clear that race and ethnic background are strongly associated with increased risk of type 2 diabetes diagnosis. Therefore, future study on this population should include a sample size large enough to achieve sufficient variability across the major racial and ethnic groups. Further, most of the research on mindfulness has been conducted with Caucasian samples. A significant gap in the literature is the absence of mindfulness measures and concepts that have been normed on racially and ethnically diverse samples.

Research question 3 considered whether or not DRD would be a mediator variable between the independent variables, mindfulness and the related concepts, awareness and acceptance, and the outcome variable, self-management. This proposed relationship was based on the hypotheses that an individual's level of DRD would intercede in the

relationships between mindfulness and self-management, awareness and self-management, and acceptance and self-management. The literature indicates that mindfulness enhances the ability to regulate emotions. As such, future research might consider the potential for mindfulness as the mediator variable in the relationship between DRD as the independent variable and self-management as the outcome variable. The rationale for this relationship would be the potential for mindfulness to affect the extent of the influence of DRD on the self-management process.

Research question 4 considered the significance of key demographic variables, age, gender, and income, over and above the significance of the theoretical variables, mindfulness, awareness, acceptance, social support, and diabetes-related distress. However, income was not entered into the regression model because the income data was incomplete and polluted with responses that suggested participant confusion. Despite the inability to use the income data, the literature related to the environmental factors (i.e., food deserts, absence of walkable neighborhoods, and food insecurity) relevant to type 2 diabetes management, indicates that the income question deserves further study. Further, researchers should use care when asking participants about socio-economic variables such as income in order to make sure that the data is provided in a usable form.

Because of the presence of physical environmental factors, the researcher's study proposal included the assessment of participant access to quality food and outlets for physical exercise. However, based on significant faculty feedback, it was recommended that the measurement of access to food and exercise be removed from the study due to the nebulous nature of access, difficulty of reliable measurement, and the potential for

participant confusion. Although difficult to measure, the lack of access to quality food and public exercise areas are major public health concerns. How to reliably measure access to food and exercise outlets is deserving of research attention in order to identify reliable assessment methods. Once a sound measurement is established, researchers can then explore the environmental and systemic barriers to effective type 2 diabetes self-management.

Although the current study did not include a formal qualitative analysis, the responses to the qualitative demographic questions (*What have you found to be most helpful in treating your type 2 diabetes?*, and *Are there activities that you engage in that keep you aware and mindful of your type 2 diabetes*?) suggest that there is much to learn about how adults with type 2 diabetes incorporate mindfulness based behaviors and activities into their lived experience. The results of the current study indicate that mindfulness is a significant predictor of self-management, and as such it would be helpful for clinicians to have more information about how this connection occurs in the daily lives of adults with type 2 diabetes. Further, an intervention study designed to determine the effects of a mindfulness-based counseling intervention with adults with type 2 diabetes would make a significant contribution to advancing mindfulness-based therapies as an evidence-based practice with this population.

Conclusion

The current study provided an exploration of the relationships between mindfulness, awareness and acceptance, diabetes-related distress, selected environmental and demographic variables, and the self-management of type 2 diabetes in adults. Survey

methodology was used with a sample of 130 adults who had been diagnosed with type 2 diabetes for at least one year prior to participation in the study. The data were analyzed, and the results for each hypothesis were presented. Consistent with the hypothesis, mindfulness was found to be a statistically significant predictor of self-management. Inconsistent with the hypotheses, no significant correlational or predictive relationships were found between awareness and acceptance and self-management or diabetes-related distress and self-management. However, social support emerged with significant correlational relationships to diabetes-related distress and self-management and as a significant predictor of self-management. The results of the current study offer implications for those who have research and clinical interests in the type 2 diabetes population. These results support continued exploration of the role of mindfulness in influencing the self-management process and continued development of resources that provide positive social support for the millions of people who are affected by this disease.

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APPENDIX A

IRB APPROVALS

To: Todd Lewis
Counsel and Ed Development
219A Curry Building

From: UNCG IRB

Authorized signature on behalf of IRB

Approval Date: 1/04/2013
Expiration Date of Approval: 1/03/2014

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Initial
Expedited Category: 7.Surveys/interviews/focus groups,5.Existing or non-research data
Study #: 12-0422
Study Title: The Relationships Between Total Mindfulness, Acceptance, Awareness, Diabetes-Related Distress and the Self-Management Behaviors of Adults with Type 2 Diabetes

This submission has been approved by the IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Study Description:

The purpose of this study is to better understand the process of type 2 diabetes self-management.

Investigator's Responsibilities

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. These consent forms must be used unless the IRB hasgiven you approval to waive this requirement.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the modification application available at http://www.uncg.edu/orc/irb.htm). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB using the "Unanticipated Problem/Event" form at the same website.

CC:
Jennifer Brown
ORC, (ORC), Non-IRB Review Contact

Approval Date: 6/19/2013
Expiration Date of Approval: 1/03/2014

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Modification
Expedited Category: Minor Change to Previously Reviewed Research
Study #: 12-0422
Study Title: The Relationships Between Total Mindfulness, Acceptance, Awareness, Diabetes-Related Distress and the Self-Management Behaviors of Adults with Type 2 Diabetes

This submission has been approved by the above IRB for the period indicated. It has been determined that the risk involved in this modification is no more than minimal.

Submission Description:

1- Paper/pencil administration will be changed to online administration using an internet panel provided by researchmatch.org.

2- The Duke Social Support Index- Brief will be added to the survey

3- Minor changes will be made to the demographic questionnaire, including the removal of question regarding access to physical execise and healthy foods, the removal of questions regarding participation in mindfulness activities, and the addition of a question regarding a parent's diagnosis with type 2 diabetes.

4- Participants will be asked to enter a drawing for one of four $50.00 gift cards.

Regulatory and other findings:

For online survey: This research meets criteria for a waiver of written (signed) consent according to 45 CFR 46.117(c)(2).

APPENDIX B

RESEARCH CONFIDENTIALITY AGREEMENT FOR RESEARCH INVOLVING HUMAN PARTICIPANTS

I _____ have agreed to assist with identifying eligible research participants for the research project entitled The Self-Management Behaviors of Adults with Type 2 Diabetes **IRB #** 12-0422**.**

I agree not to discuss or disclose any of the content or personal information contained within the data, tapes, transcriptions or other research records with anyone other than the Principal Investigator, Dr. Todd Lewis, the Co-Investigator, Jennifer Bell Brown, or in the context of the research team. I agree to maintain confidentiality at all times and to abide by the UNCG Policy and Procedure for Ethics in Research and the UNCG Policy on the Protection of Human Subjects in Research.

Date: ____/_____/_____ _____

Signature

_____

Principal Investigator

To be completed by all members of the research team with access to personal data on human research participants.

File a copy with the Principal Investigator, Dr. Todd Lewis.

APPENDIX C

STUDY COVER LETTERS

Pilot Study Cover Letter

Hello,

My name is Jennifer Bell Brown, and I am a doctoral student in the Department of Counseling and Educational Development in the School of Education at The University of North Carolina at Greensboro. In order to complete my dissertation, I am conducting research about the emotional and self-management behaviors of adults who have been diagnosed with type-2 diabetes. This study has been approved by the Office of Research Compliance at the University of North Carolina at Greensboro and authorized by the Institutional Review Board of Cone Health.

I am writing to request your participation in a brief questionnaire about your emotional experience and your behaviors while self-managing your type 2 diabetes. My goal is to learn more about the process of self-managing type 2 diabetes so that counselors, type 2 diabetes educators, doctors, nurses, and other specialists and researchers in the field of type 2 diabetes treatment can better meet the needs of those who are living with type 2 diabetes.

Your participation in this study is entirely voluntary and will take approximately 20-30 minutes of your time should you choose to complete the questionnaire. I ask that you return the completed questionnaire to me in the envelope that has been provided. The questionnaire will be kept entirely confidential in the sealed envelope.

Two informed consent forms have been provided. One of the informed consent forms is for you to keep and the other form is for you to sign and return to me.
I am very appreciative of your time and willingness to participate in this study. As a token of my appreciation, I have enclosed a $5 bill in your packet. If you should have any questions about the study, please feel free to call me at (336) 508-3043 or contact me by e-mail at jbbrown@uncg.edu.

Sincerely,

Jennifer Bell Brown, M.S., Ed.S., NCC, LPC
Doctoral Student
Counseling and Counselor Education
School of Education
The University of North Carolina at Greensboro

Full Study Cover Letter

Hello,

My name is Jennifer Bell Brown, and I am a doctoral student in the Department of Counseling and Educational Development in the School of Education at The University of North Carolina at Greensboro. In order to complete my dissertation, I am conducting research about the emotional and self-management behaviors of adults who have been diagnosed with type-2 diabetes. This study has been approved by the Office of Research Compliance at the University of North Carolina at Greensboro.

I am writing to request your participation in a brief questionnaire about your emotional experience and your behaviors while self-managing your type 2 diabetes. My goal is to learn more about the process of self-managing type 2 diabetes so that counselors, type 2 diabetes educators, doctors, nurses, and other specialists and researchers can better meet the needs of those who are living with type 2 diabetes.

Your participation in this study is entirely voluntary and will take approximately 25-30 minutes of your time. I ask that you return the completed questionnaire to me in the envelope that has been provided. The questionnaire will be kept entirely confidential in the sealed envelope.

Two informed consent forms have been provided. One of the informed consent forms is for you to keep, and the other form is for you to sign and return to me.

I am very appreciative of your time and willingness to participate in this study. If you provide a physical mailing address after you complete the study, you will be entered into a drawing for one of four $50.00 Visa gift cards. If you should have any questions about the study, please feel free to contact me by e-mail at jbbrown@uncg.edu.

Sincerely,

Jennifer Bell Brown, M.S./Ed.S., LPC, NCC
Doctoral Student
Counseling and Counselor Education
School of Education
The University of North Carolina at Greensboro

APPENDIX D

PILOT STUDY INFORMED CONSENT

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
CONSENT TO ACT AS A HUMAN PARTICIPANT

Project Title: The Self-Management Behaviors of Adults with Type 2 Diabetes
Project Director: Dr. Todd Lewis
Participant's Name:_____

What is the study about? This is a research project. It has been designed to gather information about the self-management behaviors of adults with type 2 diabetes.

Why are you asking me? Your participation is being sought because you are an adult with type 2 diabetes between 45–65 years of age who has lived with type 2 diabetes for at least one year prior to participation in this study.

What will you ask me to do if I agree to participate in the study? If you agree to participate, you will be asked to answer questions about your type 2 diabetes self-management experiences. These questions should take between 20 to 30 minutes to complete. You may return your questionnaire with your answers to the student researcher, Jennifer Bell Brown, in the envelope that has been provided for you.

What are the dangers to me? The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants. The questions in this study ask you to reflect on your experiences with type 2 diabetes. Because of this, you may feel negative emotions. If you wish to speak with someone about your emotions, you are encouraged to discuss your diabetes related experiences and emotions with your health care provider.

If you have any concerns about your rights, how you are being treated, concerns or complaints about this project or benefits or risks associated with being in this study please contact the Office of Research Compliance at UNCG toll-free at (855)-251-2351. If you have questions, want more information or have suggestions, please contact the Principal Researcher, Dr. Todd Lewis at (336) 334-3422.

Are there any benefits to me for agreeing to participate in this study? There are no direct benefits to you for your participation in this study. You may learn something about yourself from answering the questions about your type 2 diabetes self-management behaviors. You may have positive feelings about contributing to research that may help others who have also been diagnosed with type 2 diabetes.

Are there any benefits to society as a result of my participation in this study? The student researcher is hopeful that this study will provide information that may help counselors and other health care professionals provide the best possible care to those who are living with type 2 diabetes.

Will I get paid for my participation in this study? Will it cost me anything? The $5 bill included in this packet is offered in appreciation for your time. There is no cost to you for participating in this study.

How will you keep my information confidential? All information obtained in this study is strictly confidential unless disclosure is required by law. Your information will be kept private in several ways. If you choose to participate in this study please keep one copy of the Informed Consent form for your records and sign the other copy. This form will be kept separate from the rest of your packet so that the information you provide may not be identified with you. After collection the Informed Consent forms will be kept in a locked file cabinet in the office of the Principal Investigator. At the end of this study, all documents will be destroyed. The Informed Consent forms will be destroyed by shredding after 3 years, and the other data will be destroyed by shredding after 5 years.
What if I decide that I do not want to participate in the study? You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.
What about new information/changes in the study? If significant new information related to the study becomes available which may be relevant to your willingness to continue to participate, this information will be provided to you.
Full disclosure: The student researcher is employed as a part-time relief counselor at Cone Behavioral Health Hospital. The student researcher is not employed by the Cone Health facility where data for this study will be collected and is not authorized to view any participant information other than the information provided by participants for the purposes of this study.
Voluntary consent by the Participant: By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Jennifer Bell Brown.
If you choose to participate in this study: 1- return one copy of this signed Informed Consent form to the student researcher, 2- place your completed research packet into the provided envelope, 3- seal the envelope and return it to the student researcher.

Signature:_____Date:_____

Full Study Informed Consent

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO
CONSENT TO ACT AS A HUMAN PARTICIPANT

Project Title: The Self-Management Behaviors of Adults with Type 2 Diabetes
Principal Investigator: Jennifer Brown

What is the study about? This is a research project. It has been designed to gather information about the self-management behaviors of adults with type 2 diabetes.

Why are you asking me? Your participation is being sought because you are an adult with type 2 diabetes between 45–65 years of age who has lived with type 2 diabetes for at least one year prior to participation in this study. If you have been diagnosed with Schizophrenia or other psychosis and are taking anti-psychotic medications, you will be excluded from participating in this study.

What will you ask me to do if I agree to participate in the study? If you agree to participate, you will be asked to answer questions about your type 2 diabetes self-management experiences. These questions should take between 20 to 30 minutes to complete. You may return your questionnaire with your answers to Jennifer Brown in the envelope that has been provided for you.

What are the dangers to me? The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants. The questions in this study ask you to reflect on your experiences with type 2 diabetes. Because of this, you may feel negative emotions. If you wish to speak with someone about your emotions, you are encouraged to discuss your diabetes related experiences and emotions with your health care provider.

If you have any concerns about your rights, how you are being treated, concerns or complaints about this project or benefits or risks associated with being in this study please contact the Office of Research Compliance at UNCG toll-free at (855)-251-2351.

Are there any benefits to me for agreeing to participate in this study? There are no direct benefits to you for your participation in this study. You may learn something about yourself from answering the questions about your type 2 diabetes self-management behaviors. You may have positive feelings about contributing to research that may help others who have also been diagnosed with type 2 diabetes.

Are there any benefits to society as a result of my participation in this study? The principal investigator is hopeful that this study will provide information that may help counselors and other health care professionals provide the best possible care to those who are living with type 2 diabetes.

Will I get paid for my participation in this study? Will it cost me anything? There is no cost to you for participating in this study. If you complete the survey you may provide your e-mail address to be entered into a drawing for one of four $50.00 Visa gift cards. If your e-mail address

is drawn, the researcher will contact you and request a mailing address so that the gift card can be mailed to you.

How will you keep my information confidential? All information obtained in this study is strictly confidential unless disclosure is required by law. Your information will be kept private in several ways. If you choose to participate in this study please keep one copy of the Informed Consent form for your records and sign the other copy. This form will be kept separate from the rest of your packet so that the information you provide may not be identified with you. After collection the Informed Consent forms will be kept in a locked file cabinet in the office of the Faculty Advisor, Dr. Todd Lewis. At the end of this study, all documents will be destroyed. The Informed Consent will be deleted after 3 years, and the other data will be deleted after 5 years.

What if I decide that I do not want to participate in the study? You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study? If significant new information related to the study becomes available which may be relevant to your willingness to continue to participate, this information will be provided to you.

Full disclosure: The principal investigator is employed as a part-time relief counselor at Cone Behavioral Health Hospital. The principal investigator is not authorized to view any participant information other than the information provided by participants for the purposes of this study. The faculty advisor is a professor in the Department of Counseling and Educational Development at The University of North Carolina-Greensboro.

Voluntary consent by the Participant: By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Jennifer Bell Brown.

If you choose to participate in this study: 1- return one copy of this signed Informed Consent form to the student researcher, 2- place your completed research packet into the provided envelope, 3- seal the envelope and return it to the student researcher.

Signature:_____Date:_____

APPENDIX E

PILOT STUDY PARTICIPANT RECRUITMENT FLYER

Seeking Type 2 Diabetes Patients for a Questionnaire Study

Project Title: The Self-Management Behaviors of Adults with Type 2 Diabetes
Principal Investigator: Dr. Todd Lewis

WHAT IS THE STUDY ABOUT: The purpose of the study is to better understand the process of type 2 diabetes self-management. This research project will take you about 20 to 30 minutes to complete a one time questionnaire about your experience of managing your type 2 diabetes

ELIGIBILITY: Men and women between 45-65 years of age who have been diagnosed with type 2 diabetes for at least one year prior to participation in the study.

LOCATION OF THE STUDY: You may complete the study questionnaire in this office and return to the student researcher prior to your visit with your health care provider.

NEGATIVE AFFECTS OF THE STUDY: There are no known or foreseeable risks involved in this study other than the 20 to 30 minutes that you spend on this project.

BENEFITS OF PARTICIPATION IN THE STUDY: There are no direct benefits to you for your participation in this study. You may learn something about yourself from answering the questions about your type 2 diabetes self-management behaviors. You may have positive feelings about contributing to research that may help others who have also been diagnosed with type 2 diabetes.

CONFIDENTIALITY: We will do everything possible to make sure that your information is kept confidential. All information obtained in this study is strictly confidential unless disclosure is required by law. If you choose to participate in this study you will be asked to sign two copies of the Informed Consent Form. One copy will be returned to you for your records and the other form will be kept separate from the rest of your packet so that the information you provide may not be identified with you. After collection, the Informed Consent Forms will be kept in a locked file cabinet in the office of the principal investigator. The Informed Consent forms will be destroyed by shredding after 3 years, and the other data will be destroyed by shredding after 5 years.

IF YOU DO NOT WISH TO PARTICIPATE: You do not have to be part of this project. This project is voluntary, and it is up to you to decide to participate in this research project. If you agree to participate at any time in this project you may stop participating without penalty.

COMPENSATION: $5 will be given to you as a token of appreciation for the time that you give to participate in this study.

IF YOU HAVE QUESTIONS: You can contact the student researcher, Jennifer Bell Brown at (336) 508-3043 or jbbrown@uncg.edu, or the principal investigator, Dr. Todd Lewis at (336) 334-3422 or tflewis@uncg.edu. For complaints about this project or questions about the benefits or risks associated with being in this study please contact the Office of Research Compliance at UNCG toll-free at (855)-251-2351.

Full Study Recruitment Flyer

Seeking Type 2 Diabetes Patients for a Questionnaire Study

Project Title: The Self-Management Behaviors of Adults with Type 2 Diabetes
Principal Investigator: Jennifer Brown

WHAT IS THE STUDY ABOUT: The purpose of the study is to better understand the process of type 2 diabetes self-management. This research project will take you about 20 to 30 minutes to complete a one time questionnaire about your experience of managing your type 2 diabetes.

ELIGIBILITY: Men and women between 45-65 years of age who have been diagnosed with type 2 diabetes at least one year prior to participation in the study, who have not been diagnosed with a psychotic condition or are taking anti-psychotic medications.

LOCATION OF THE STUDY: You may complete the study questionnaire in this office and return it to the student researcher.

NEGATIVE AFFECTS OF THE STUDY: There are no known or foreseeable risks involved in this study other than the 20 to 30 minutes that you spend on this project.

BENEFITS OF PARTICIPATION IN THE STUDY: There are no direct benefits to you for your participation in this study. You may learn something about yourself from answering the questions about your type 2 diabetes self-management behaviors. You may have positive feelings about contributing to research that may help others who have also been diagnosed with type 2 diabetes.

CONFIDENTIALITY: We will do everything possible to make sure that your information is kept confidential. All information obtained in this study is strictly confidential unless disclosure is required by law. You will be asked to sign two copies of the Informed Consent Form. One copy will be returned to you for your records, and the other form will be kept separate from the rest of your packet so that the information you provide may not be identified with you. After collection the Informed Consent forms will be kept in a locked file cabinet in the office of the Faculty Advisor, Dr. Todd Lewis. At the end of this study, all documents will be destroyed. The Informed Consent will be deleted after 3 years, and the other data will be deleted after 5 years.

IF YOU DO NOT WISH TO PARTICIPATE: You do not have to be part of this project. This project is voluntary, and it is up to you to decide to participate in this research project. If you agree to participate at any time in this project you may stop participating without penalty.

COMPENSATION: There is no direct compensation for your participation in this study. If you provide a physical mailing address after your completion of the survey, you will be entered into a drawing for one of four $50.00 Visa gift cards.

IF YOU HAVE QUESTIONS: You can contact the principal investigator, Jennifer Bell Brown at jbbrown@uncg.edu, or the faculty advisor, Dr. Todd Lewis at tflewis@uncg.edu. For complaints about this project or questions about the benefits or risks associated with being in this study please contact the Office of Research Compliance at UNCG toll-free at (855)-251-2351.

APPENDIX F

INTERNET RECRUITMENT E-MAIL

Thank you for your interest in participating in this research study through Researchmatch.org!

Participation in this study involves answering a questionnaire about your emotional experience and your behaviors while self-managing your type 2 diabetes. The goal of the study is to learn more about the process of self-managing type 2 diabetes so that counselors, type 2 diabetes educators, doctors, nurses, and other specialists and researchers can better meet the needs of those who are living with type 2 diabetes.

Your participation in this study is entirely voluntary and will take approximately 25-30 minutes of your time.

After you complete the study, you may provide your e-mail address so that you can be entered into a drawing for one of four $50.00 Visa gift cards. If your e-mail address is drawn, the Principal Investigator will contact you and request a mailing address so that the gift card can be mailed to you.

Thank you,

Jennifer Bell Brown, M.S., Ed.S., Principal Investigator
Doctoral Student
Department of Counseling and Counselor Education
School of Education
The University of North Carolina at Greensboro

APPENDIX G

FIVE FACET MINDFULNESS QUESTIONNAIRE (FFMQ)

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes <u>your own opinion</u> of what is <u>generally true for you</u>.

1	2	3	4	5
never or very rarely true	**Rarely True**	**sometimes true**	**Often true**	**very often or always true**

_____ 1. When I'm walking, I deliberately notice the sensations of my body moving.

_____ 2. I'm good at finding words to describe my feelings.

_____ 3. I criticize myself for having irrational or inappropriate emotions.

_____ 4. I perceive my feelings and emotions without having to react to them.

_____ 5. When I do things, my mind wanders off and I'm easily distracted.

_____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.

_____ 7. I can easily put my beliefs, opinions, and expectations into words.

_____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.

_____ 9. I watch my feelings without getting lost in them.

_____ 10. I tell myself I shouldn't be feeling the way I'm feeling.

_____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

_____ 12. It's hard for me to find the words to describe what I'm thinking.

_____ 13. I am easily distracted.

_____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

_____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.

_____ 16. I have trouble thinking of the right words to express how I feel about things

_____ 17. I make judgments about whether my thoughts are good or bad.

_____ 18. I find it difficult to stay focused on what's happening in the present.

_____ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.

_____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

_____ 21. In difficult situations, I can pause without immediately reacting.

_____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.

_____ 23. It seems I am "running on automatic" without much awareness of what I'm doing.

_____24. When I have distressing thoughts or images, I feel calm soon after.

_____ 25. I tell myself that I shouldn't be thinking the way I'm thinking.

_____ 26. I notice the smells and aromas of things.

_____ 27. Even when I'm feeling terribly upset, I can find a way to put it into words.

_____ 28. I rush through activities without being really attentive to them.

_____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.

_____ 30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.

_____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

_____ 32. My natural tendency is to put my experiences into words.

_____ 33. When I have distressing thoughts or images, I just notice them and let them go.

_____ 34. I do jobs or tasks automatically without being aware of what I'm doing.

_____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

_____ 36. I pay attention to how my emotions affect my thoughts and behavior.

_____ 37. I can usually describe how I feel at the moment in considerable detail.

_____ 38. I find myself doing things without paying attention.

_____ 39. I disapprove of myself when I have irrational ideas.

APPENDIX H

PHILADELPHIA MINDFULNESS SCALE (PHLMS)

PHLMS©

Instructions: Please circle how often you experienced each of the following statements *within the past week.*

1. I am aware of what thoughts are passing through my mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

2. I try to distract myself when I feel unpleasant emotions.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

3. When talking with other people, I am aware of their facial and body expressions.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

4. There are aspects of myself I don't want to think about.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

5. When I shower, I am aware of how the water is running over my body.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

6. I try to stay busy to keep thoughts or feelings from coming to mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

7. When I am startled, I notice what is going on inside my body.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

8. I wish I could control my emotions more easily.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

9. When I walk outside, I am aware of smells or how the air feels against my face.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

10. I tell myself that I shouldn't have certain thoughts.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

11. When someone asks how I am feeling, I can identify my emotions easily.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

12. There are things I try not to think about.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

13. I am aware of thoughts I'm having when my mood changes.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

14. I tell myself that I shouldn't feel sad.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

15. I notice changes inside my body, like my heart beating faster or my muscles getting tense.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

16. If there is something I don't want to think about, I'll try many things to get it out of my mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

17. Whenever my emotions change, I am conscious of them immediately.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

18. I try to put my problems out of mind.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

19. When talking with other people, I am aware of the emotions I am experiencing.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

20. When I have a bad memory, I try to distract myself to make it go away.

1	2	3	4	5
Never	Rarely	Sometimes	Often	Very Often

APPENDIX I

DIABETES DISTRESS SCALE-17 (DDS-17)

DIRECTIONS: Living with diabetes can sometimes be tough. There may be many problems and hassles concerning diabetes and they can vary greatly in severity. Problems may range from minor hassles to major life difficulties. Listed below are 17 potential problem areas that people with diabetes may experience. Consider the degree to which each of the 17 items may have distressed or bothered you DURING THE PAST MONTH and circle the appropriate number.

Please note that we are asking you to indicate the degree to which each item may be bothering you in your life, NOT whether the item is merely true for you. If you feel that a particular item is not a bother or a problem for you, you would circle "1." If it is very bothersome to you, you might circle "6."

	Not a Problem	**A Slight Problem**	**A Moderate Problem**	**Somewhat Serious Problem**	**A Serious Problem**	**A Very Serious Problem**
1. Feeling that diabetes is taking up too much of my mental and physical energy every day.	1	2	3	4	5	6
2. Feeling that my doctor doesn't know enough about diabetes and diabetes care.	1	2	3	4	5	6
3. Feeling angry, scared, and/or depressed when I think about living with diabetes.	1	2	3	4	5	6
4. Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.	1	2	3	4	5	6
5. Feeling that I am not testing my blood sugars frequently enough.	1	2	3	4	5	6
6. Feeling that I am often failing with my diabetes routine.	1	2	3	4	5	6
7. Feeling that friends or family are not supportive enough of self-care efforts (e.g. planning activities that conflict with my schedule, encouraging me to eat the "wrong" foods).	1	2	3	4	5	6

(Cont.)

	Not a Problem	A Slight Problem	A Moderate Problem	Somewhat Serious Problem	A Serious Problem	A Very Serious Problem
8. Feeling that diabetes controls my life.	1	2	3	4	5	6
9. Feeling that my doctor doesn't take my concerns seriously enough.	1	2	3	4	5	6
10. Not feeling confident in my day-to-day ability to manage diabetes.	1	2	3	4	5	6
11. Feeling that I will end up with serious long-term complications, no matter what I do.	1	2	3	4	5	6
12. Feeling that I am not sticking closely enough to a good meal plan.	1	2	3	4	5	6
13. Feeling that friends or family don't appreciate how difficult living with diabetes can be.	1	2	3	4	5	6
14. Feeling overwhelmed by the demands of living with diabetes.	1	2	3	4	5	6
15. Feeling that I don't have a doctor who I can see regularly enough about my diabetes.	1	2	3	4	5	6
16. Not feeling motivated to keep up my diabetes self management.	1	2	3	4	5	6
17. Feeling that friends or family don't give me the emotional support that I would like.	1	2	3	4	5	6

APPENDIX J

SELF CARE INVENTORY–REVISED (SCI–R)

Self Care Inventory-Revised Version (SCI-R)

This survey measures what you *actually do*, not what you are advised to do. How have you followed your diabetes treatment plan in the past 1-2 months?

	Never	Rarely	Sometimes	Usually	Always	
	▼	▼	▼	▼	▼	
1. Check blood glucose with monitor	1	2	3	4	5	
2. Record blood glucose results	1	2	3	4	5	
3. If type 1: Check ketones when glucose level is high	1	2	3	4	5	Have type 2 diabetes
4. Take the correct dose of diabetes pills or insulin	1	2	3	4	5	Not taking diabetes pills or insulin
5. Take diabetes pills or insulin at the right time	1	2	3	4	5	Not taking diabetes pills or insulin
6. Eat the correct food portions	1	2	3	4	5	
7. Eat meals/snacks on time	1	2	3	4	5	
8. Keep food records	1	2	3	4	5	
9. Read food labels	1	2	3	4	5	
10. Treat low blood glucose with just the recommended amount of carbohydrate	1	2	3	4	5	Never had low blood glucose
11. Carry quick acting sugar to treat low blood glucose	1	2	3	4	5	
12. Come in for clinic appointments	1	2	3	4	5	
13. Wear a Medic Alert ID	1	2	3	4	5	
14. Exercise	1	2	3	4	5	
15. If on insulin: Adjust insulin dosage based on glucose values, food, and exercise	1	2	3	4	5	Not on insulin

APPENDIX K

DUKE SOCIAL SUPPORT SCALE–SHORT FORM

Social Interaction Subscale

1. Other than members of your family, how many persons in this area within one hours travel (of your home/from here) do you feel you can depend on or feel very close to?

	NUMBER
None	00

[scoring 0=1, 1-2=2, >2=3]

2. (Other than at work) How many times during the past week did you spend some time with someone who does not live with you, that is, you went to see them or they came to visit you, or you went out together?

None	00
Once	01
Twice	02
Three times	03
Four	04
Five	05
Six	06
Seven or more	07

[scoring 0=1, 1-2=2, >2=3]

3. (Other than at work) How many times did you talk to someone -- friends, relatives or others -- on the telephone in the past week (either they called you, or you called them)?

None	00
Once	01
Twice	02
Three times	03
Four	04
Five	05
Six	06
Seven or more	07

[scoring 0 or 1=1, 2-5=2, >5=3]

4. (Other than at work) About how often did you go to meetings of clubs, religious meetings, or other groups that you belong to in the past week?

None	00
Once	01
Twice	02
Three times	03
Four	04
Five	05
Six	06
Seven or more	07

[scoring 0 or 1=1, 2-5=2, >5=3]

<u>Subjective Social Support</u>

5. Does it seem that your family and friends (i.e., people who are important to you) understand you most of the time, some of the time, or hardly ever?

Hardly Ever	1
Some	2
Most	3

6. Do you feel useful to your family and friends (i.e., people important to you) most of the time, some of the time, or hardly ever?

Hardly Ever	1
Some	2
Most	3

7. Do you know what is going on with your family and friends most of the time, some of the time, or hardly ever?

Hardly Ever	1
Some	2
Most	3

8. When you are talking with your family and friends, do you feel you are being

listened to most of the time, some of the time, or hardly ever?	Hardly Ever	1
	Some	2
	Most	3

9. Do you feel you have a definite role (place) in your family and among your friends most of the time, some of the the time, or hardly ever?	Hardly Ever	1
	Some	2
	Most	3

10. Can you talk about your deepest problems with at least some of your family and friends most of the time, some of the the time, or hardly ever?	Hardly Ever	1
	Some	2
	Most	3

11. How satisfied are you with the kinds of relationships you have with your family and friends -- very dissatisfied, somewhat dissatisfied, or satisfied?	Very Dissatisfied	1
	Somewhat Dissatisfied	2
	Satisfied	3

APPENDIX L

PILOT STUDY DEMOGRAPHIC QUESTIONNAIRE

Directions: Please **circle, check or fill in** the appropriate information for each question. The information collected from this questionnaire is for data analysis purposes only. Your responses will not be used to identify you as an individual.

1. **When were you diagnosed with type 2 diabetes?** (month / year)_____

2. **Your Hba1c score at the time of your type 2 diabetes diagnosis? _____**

3. **Your current Hba1c score? _____**

4. **What is your age**?_____

5. **What is your sex**?

   Male_____ Female_____

6. How do you racially and/or ethnically identify yourself? (circle all that apply)

Hispanic or Non-Hispanic	Asian
Caucasian or White	Alaska Native
African American or Black	Native Hawaiian
Native American	Other Pacific Islander

7. **Number of persons in your household**:_____

8. Annual household income: (Check One)

___ $0-9,999

___$10,000-19,999

___$20,000-29,999

___$30,000-39,999

___$40,000-49,000

___$50,000 and above

9. To what extent do you have daily access to foods that were recommended to you for the management of your type 2 diabetes?

___I do not have daily access (0 days a week).

___I have minimal daily access (1-3 days a week).

___I have moderate daily access (4-6 days a week).

___I have total daily access (7 days a week).

10. Do you have access to at least one outlet for physical activity (such as walking, riding bicycle, swimming, or gardening)?

____No, I do not have access to at least one outlet for physical exercise.
____Yes, I do have access to at least one outlet for physical exercise.

Mindfulness involves your ability to notice sights, sounds, smells, tastes, and physical sensations and your ability to pay attention to your feelings and thoughts. Participation in certain activities such as meditation, yoga, or tai-chi may help you to become more mindful of what is happening inside and outside of your body. Questions 11-15 are about mindfulness related activities.

11. Do you participate in mindfulness activities such as meditation, Yoga, or Tai Chi Chuan?

____No ____Yes

12. If you answered yes to question #11, please indicate which activities you participate in (Check all that apply):

____ Meditation
____Yoga
____Tai Chi Chuan
Other, please specify_____

13. How often do you participate in mindfulness activities?

____I do not participate in mindfulness activities
____Once a week
____Twice a week

____Three times a week
____Four times a week
____Five times a week
____Six times a week
____Everyday

14. **Have you participated in a mindfulness-based training or intervention?**

___No ___Yes

15. **If you answered Yes to question #14, please indicate the type of training or intervention:**

_____Mindfulness-based Stress Reduction (MBSR)

_____Acceptance and Commitment Therapy (ACT)

_____Mindfulness-based Cognitive Therapy (MBCT)

_____Other, please specify_____

Full Study Demographic Questionnaire

Directions: Please **check or provide** the appropriate information for each question. The information collected from this questionnaire is for data analysis purposes only. Your responses will not be used to identify you as an individual.

1. What is your age? (in years)_____

2. What is your biological sex?
- ❍ Male (1)
- ❍ Female (2)

3. Are you managing a physical illness/illnesses other than your type 2 diabetes?
- ❍ Yes (1)
- ❍ No (2)

4. How do you racially and/or ethnically identify yourself? Click all that apply.
- ❑ Hispanic (1)
- ❑ Non-Hispanic (2)
- ❑ African-American or Black (3)
- ❑ Caucasian or White (4)
- ❑ Asian (5)
- ❑ Native American (6)
- ❑ Alaska Native (7)
- ❑ Native Hawaiian (8)
- ❑ Pacific Islander (9)
- ❑ Other (10) _____

5. What was your Hba1c score at the time of your diagnosis? (just your best estimate)_____

6. What is your current Hba1c score? (just your best estimate)_____

7. Do you have a parent who was diagnosed with Type 2 Diabetes?

- ❍ Yes
- ❍ No
- ❍ Do not know

8. Number of persons in your household._____

9. Please provide your monthly household income. (just your best estimate)_____

10. What have you found to be most helpful in treating your Type 2 Diabetes?

_____
_____
_____
_____
_____

11. Are there activities you engage in that keep you aware and mindful of your Type 2 Diabetes?

_____
_____
_____
_____
_____
_____

Thank you for completing this survey!

If you would like to be entered into the drawing for one of four $50.00 Visa gift cards, please provide your e-mail address below. If your e-mail address is drawn, the researcher will contact you and request a mailing address so that the gift card can be mailed to you._____

APPENDIX M

PERMISSION TO USE INSTRUMENTS

E-mail permission to use the Diabetes Distress Scale (DDS)

Hi
Feel free to use the scales as you wish. Attached is a pdf with the relevant information. No cost is involved. Please that a new paper indicates that a mean item score of 2.0 to 2.9 is considered moderate distress and is of clinical importance (see DIABETES CARE), and we also have a 2-item screener available (see ANNALS OF FAMILY MEDICINE). Hope this is helpful.
L.
Lawrence Fisher, Ph.D., ABPP
Professor
Department of Family and Community Medicine
Box 0900
UC San Francisco
San Francisco, CA 94143

E-mail permission to use the Five Facet Mindfulness Questionnaire (FFMQ)

Hi Jennifer,
You're welcome to use the FFMQ, permission is not required and there's no charge. I've attached a copy with scoring instructions.
Good luck with your project!
Ruth Baer
Ruth A. Baer, PhD
Professor of Psychology
Dept of Psychology
115 Kastle Hall
University of Kentucky
Lexington, KY 40506-0044

E-mail permission to use the Self-Care Inventory Revised (SCI-R)

that's fine. Just follow the instructions on my faculty website and send a letter of agreement
Annette M. La Greca, Ph.D., ABPP
Cooper Fellow
Professor of Psychology and Pediatrics
Director of Clinical Training
PO Box 249229
University of Miami
Coral Gables, FL 33123

E-mail permission to use the Philadelphia Mindfulness Scale (PHLMS)

Hi Jennifer,

Thank you for your interest in our work. You have our permission to use the PHLMS—it is free to use. Scoring instructions and items can be found in the Cardaciotto et al (2008) manuscript. I would be happy to forward you a copy of the PHLMS and manuscript when I return to the office (La Salle is closed today and tomorrow due to the hurricane) – just let me know if that would be helpful. Otherwise, best wishes to you in your research.

Sincerely,

LeeAnn

LeeAnn Cardaciotto, Ph.D.
Assistant Professor
Director of Field Placement, M.A. Program in Clinical Counseling Psychology
Department of Psychology
La Salle University
Box 268
1900 W. Olney Avenue
Philadelphia, PA 19141-1199

E-mail permission to use the Duke Social Support Inventory (DSSI)

Hi Jennifer,

I apologize. I meant to send you these materials a few days ago. Attached are two documents: the short form of the DSSI and a technical paper about the DSSI. I'm not sure that the latter will be of use to you because it is based on the long form of the DSSI, but just in case….

Good luck with your research and again, my apologies for the tardiness of this email.

Best,

Linda

APPENDIX N

PERMISSION TO REPRINT MODELS

Permission to reprint the Adaptation to Chronic Illness Model (Figure 4)

Dear Jennifer,

Thank you for your request. You can consider this email as permission to reprint the material as detailed below in your upcoming dissertation. Please note that this permission does not cover any 3rd party material that may be found within the work. We do ask that you properly credit the original source, SAGE Publications. Please contact us for any further usage of the material.

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Permission to reprint the Adapting to Diabetes Mellitus model (Figure 5)

Nursing science quarterly

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The Diabetes educator

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Expected completion date	May 2014
Expected size (number of pages)	299
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